CiSTUP News Letter
Centre for infrastructure, Sustainable Transportation and Urban Planning, Indian Institute of Science, Bangalore , INDIA
CiSTUP
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# A Vehicle for Analytical Thinking to Improve the Unique Urban Issues

## Message by Mr. Anjum Parwez, IAS
## MD of BMTC

It is heartening to note that CiSTUP has been regularly bringing out its newsletter every four month (almost since the first issue which was published in November 2009). This is the volume 4 issue 2 .The centre has successfully completed its 5 years with various activities covering all the theme areas and disseminated the information to a large audience.

Change is never easy. That is of especially true when it involves lot of R & D activities and research especially with reference to transportation infrastructure and urban issues.

Recently, I have been invited to be the chief guest of the CiSTUP 5th foundation day seminar on January 10th 2014.I congratulated CiSTUP team on completing 5 successful years also mentioned how CiSTUP has helped BMTC in formulating their vision. On going through the newsletter I find that the planners at the centre are carrying out different projects connected with the main theme of the CiSTUP. The ambitious projects, the culmination of more than 5years of planning as the vision of CiSTUP. Five years is a challenging time for anyone.

BMTC is one of the major stakeholders of this centre and I am confident that CiSTUP in the days to come will be much more involved with us.

I congratulate Chairman CiSTUP and his team for the excellent work done.

## Message by Prof. T. G. Sitharam,
## Chairman CiSTUP, Indian Institute of Science

After 5 years of existence, the CiSTUP News Letter has established itself as a medium to strengthen and push forward the fast growing research community on the vision of CiSTUP, to produce knowledge that addresses the unique urban issues specifically on sustainable urban transportation along with other related topic of infrastructure and urban planning. In the last 5 years centre has executed more than 75 research projects by faculty of IISc, Staff, scientists & planners at CiSTUP in the area of the mandate and issues relevant the State of Karnataka.

In this issue you will read about the events held during foundation day 5th anniversary on 10th January 2014.

CiSTUP foundation day is planned annually during the foundation day celebrations (2nd January) of CiSTUP. This is the 5th year of foundation day. The programme for this foundation day of the centre exhibits and presentations are being tailored to ensure the closer interaction between research, stake holders and policy. The seminar addressed the problems and solutions in the area of infrastructure, transportation and urban planning of our cities. The presentations covered the work carried out by scientists associated with our centre. The abstract, gives the summary of the talks given by lead speakers and lectures by scientist associated with

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## MESSAGE

CiSTUP. This was attended in large numbers by students of masters degrees from various engineering colleges of Bangalore, faculty and members associated with CiSTUP.

A theme talk on sustainability and rail transit was held on 8th October 2013 at CiSTUP jointly with Curtin University Sustainable Policy (CUSP), Perth.

A Science Media Consultation meeting with Workshop was held on 15th November 2013 at CiSTUP for raising awareness among key stake holders and elicit their views suggestions and contributions for setting up "Science Media Centre (SMC)"- India and role played by it in bridging the gap between UK Science and Media.

The Centre has also conducted in an interaction programme for engineering students from Bagalkote are 10th December 2013. About 40 students attended and interacted. There were also quiz competition structure for students and also participated dynamically in the competition.

I thank everyone who has contributed to the newsletter.

Please feel free to contact us with any suggestions or comments.


## Contents of Newsletter:

# ACTIVITIES OF CISTUP IN THE LAST FIVE YEARS (March 2009 – March 2014)

**By Prof. T. G. SITHARAM**

The Center for infrastructure, Sustainable Transportation and Urban Planning (CiSTUP) of Indian institute of Science (IISc) is established in the year 2009 during the centenary celebrations of Indian Institute of Science, with inputs from many visionaries, organizations and has plans and road map to be one of the finest centers of advanced research and training in the field of transportation engineering in India and abroad. The mandate and vision of CiSTUP is to produce knowledge that addresses the unique urban issues specifically on sustainable urban transportation along with other related topics of infrastructure and urban planning. In the last five years, centre has executed more than 75 research projects executed by faculty of Indian Institute of Science, staff, scientists and planners at CiSTUP in the area of infrastructure, transportation and urban planning issues relevant to the state of Karnataka.

CiSTUP started an M. Tech in Transportation and infrastructure engineering, wherein full time staff from BMTC and KSRTC were benefitted to get their advance degree at IISc (who came on deputation from their organizations) in addition to other students who have selected through national competition. We have also trained many students both at Ph.D. level, Masters level, post doctoral fellows and student interns. Many programmes like CiSTUP fellows, CiSTUP post doctoral fellows and summer interns through which any students (more than 250 students) across the country have visited CiSTUP and interacted with scientists and worked on projects of relevance to our city and state. Further, centre has conducted training programmes, capacity building and also developed expertise and provided complete technological and planning solutions for urban renewal and development programmes related to urban transportation and infrastructure engineering.

The main areas of Specialization and Interest are Infrastructure, Sustainable URBAN Transportation and Urban Planning. CiSTUP was able to carry out some impact projects like campaign for creation of Bangalore suburban rail corporation, creation of Hubli-Dharwad BRT, implementation of ITS for public transport in Mysore city and other projects with Directorate of Urban land transport. In addition, at CISTUP we have executed funded research projects, consulting projects and brainstorming sessions. CiSTUP foundation day has been organized since Jan 2010, annually during the foundation day celebrations (1st week of January) of CiSTUP. This year is the 5th year of Foundation Day. The programme for the 5th Foundation of CiSTUP exhibits and presentations are being tailored to ensure the closer interaction between research, stakeholders and policy. The seminar address issues, problems and solutions in the area of infrastructure, transportation and planning of our cities in India. The activities emerged in the MoU between Government of Karnataka (GOK) & IISc has been carried out in toto.

## ACTIVITIES AT THE CENTRE

# Workshop on "Sustainability and Rail Transit"

**Date: 08th October 2013 Time: 10.00 am to 1.00pm Venue: CiSTUP Conference Hall, SID Complex, IISc**

CiSTUP jointly with Curtin University Sustainability Policy (CUSP) organized a theme talk on "Sustainability and Rail Transit" on 8th October 2013

The details of the talk are as follows:

1) "Does more wealth mean more car use?" by Prof. PETER NEWMAN.

2) "Best practice transit oriented development from around the world" by Dr. JAN SCHEUR.

3) "Perth's Southern Rail: Why it Works?" by Mr. JAMES MCINTOSH

### Curtin University Sustainability Policy (CUSP) :

Curtin University Sustainability Policy (CUSP) Institute was established in January 2008, headed by Professor Peter Newman, and based in Fremantle. The idea of "sustainability" in a wide range of human endeavour is a relatively new concept, but is rapidly becoming a key issue in public policy theory and practice. Sustainability policy is also developing as a recognised profession and a multidisciplinary research field in its own right. CUSP is a key player in the Australian Sustainable Development Institute (ASDI) encompassing a broad range of Curtin research centres and teams involved in sustainability scholarship

### About the Speakers:
### Prof. Peter Newman.:

Peter Newman is the Professor of Sustainability at Curtin University in Perth. He is on the Board of Infrastructure Australia and is a Lead Author for Transport on the IPCC. Peter is the leader of the AusAID project on Sustainable Transport and Deliberative Democracy in India. His books include 'Green Urbanism in Asia' (2012), 'Resilient Cities: Responding to Peak Oil and Climate Change'(2009), 'Green Down Under' (2009) and 'Sustainability and Cities: Overcoming Automobile Dependence' with Jeff Kenworthy which was launched in the White House in 1999.

### DR. JAN SCHEURE:

Dr Jan Scheurer is a Senior Research Associate at Curtin University(Perth) and RMIT University (Melbourne). Trained as an urban designer,he joined the Murdoch University-based Institute for Sustainability and Technology Policy (ISTP) in 1997 to undertake Ph.D research on the context of urban form and sustainable mobility behavior.In recent years, he hasco-developed an award-winning spatial accessibility tool (Spatial Network Analysis for Multimodal Urban Transport Systems or SNAMUTS) to assess the performance of public transport networks and the success (or not)of integrated land use and transport planning in 25 Global cities

### MR. JAMES MCINTOSH

James is a Value Capture expert, qualified Land use planner,Transport Planner and Registered Cadastral Surveyor, and is currently finalizing his PhD at the CUSP Institute in developing a "Comprehensive assessment framework for valuing transport infrastructure projects". James has16 years of professional experience in multidisciplinary engineering and environmental consultancies in Australia (SKM and pitt & sherry) and for his own firm, James McIntosh Consulting, as well as international experience in hydrocarbon exploration (Western Geophysical). See for details at Website: http://cistup.iisc.ernet.in/presentations/pn.pdf

## A Science Communication Workshop

**Date: 14th November 2013 Time: 1:30pm-5:45pm**
**Venue: CiSTUP Conference hall**

### Aim of the Workshop:

The aim of the workshop was to provide the insights into how scientists and journalists can work together to improve science communication and promotion.

The welcome remarks was done by Dr. Tomwells, Deputy Head of UK Science and innovation team, British Deputy High Commission. Later inaugural talk was by Prof. Siva Umapathy, Department of organic and physical Chemistry, Indian Institute of science.

Dr. Helen Jamison made presentation on "science communication in the UK." And Mr. Simon Wilde who is associate director, NICE shared his ideas on "Science communication in the UK.

The debate panel on science in the Media was also organized in the workshop which was carried out by Kate Kelland


### There was parallel Workshop:

In which there was top training for scientist- Dr.Simon Wilde and Ms. Victoria Steven from royal Society of chemistry.

Best practice guidelines for journalists covering science from Dr. Helen Bailey and Mr. Kate Kelland

The closing remarks were done by Dr. Tom Wells.

## A Science Media Centre Consultation Meeting

**Date: 15th November 2013 Time: 9:00am-1:30pm**
**Venue: CiSTUP Conference hall**

### Aim of the workshop:

- To raise the awareness among key stakeholders and elicit their views, suggestions and contributions for setting up Science Media centre (SMC) - India.
- To seek stakeholders support
- To Gain insights into UK SMC and its role in bridging gap between UK Science and Media.

## ACTIVITIES AT THE CENTRE

**Meeting cum Workshop was held on 15 th November 2013 at CiSTUP** conference hall for raising awareness among key stakeholders and elicit their views ,suggestions and contributions for setting up SCIENCE MEDIA CENTRE (SMC)-India. This meeting also gave insights into the working of UK SMC and the role played by it in bridging the gap between UK science and the media.

The programme commenced with introductory remarks by the CiSTUP Chairman, **Prof. T. G. Sitharam** followed by the inaugural address by **Prof. V. S. Ramamurthy, Director**, National Institute of Advanced Studies (NIAS) & **Shri. K. N. Shanth Kumar**, Editor Prajavani.

**Prof. Rahul Pandit** presented, IISc and spoke at the inauguration. This was followed by panel discussions - Indian Perspective on Indian Science Media Centre – this was chaired **by Dr. T. V. Venkateshwaran, Scientist, Vigyan Prasar**. The participants in the discussions were as follows:

- **Prof. SivaUmapathy**, Indian Institute of Science
- **Dr. P. K. Hegde,** Head Publications and Science communication Unit, National Chemical Laboratory, Pune.
- **Ms. SeemaSingh, S**cience Editor, FORBES India .
- **Mr. DakshinMurthy**, The Hindu.
- **Prof. Rajagopalan**, International Institute of Information Technology, Bangalore.
- **Mr. L. Shyamal**, Wikipedia Editor.
- **Dr. K. V. S. A. S. Sharma**, Head of Information &Publicity, CFTRI, Mysore.

Insights on the science media centre from the UK SMC---This was chaired by **Dr. TomWells, Deputy Head of the Science and Innovation Network. Opening remarks were delivered by Mr. IanFelton, British Deputy High Commissioner. Dr. HelenJamison**, Deputy Director, UK SMC gave a talk on "ORIGINS & OPERATION OF THE UK SMC" – how it was set up, areas of work , the funding pattern and its achievements.

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**Mr. Simon Wilde**, Associate Director (External Communications),UK National Institute of Health & Care Excellence gave a brief talk on "PERSPECTIVE OF A PRESS OFFICER WORKING WITH THE SMC"- benefits of working with the SMC.

**Ms. Victoria Stevens**, Communications Team, Royal Society of Chemistry gave details about his organisations working with the press and the SMC.

Prof. S. Umapathy of the Indian Institute of Science initiated discussions on the establishment of Indian Science Media Centre – its vision, structure, objectives and the model for its funding.

The entire workshop cum discussion was wrapped up with a vote of thanks followed by networking lunch.

# Orientation programme for Students from Bagalkot

**Date 10th December 2013 Venue: CiSTUP class room, IISc**

There was orientation programme arranged for the students from Bagalkot. This programme was organized by Prof. T. G. Sitharam, Chairman, CiSTUP. This was attended by almost 30- 40 students where in research work at Cistup and information about urban mobility shared with the students by:

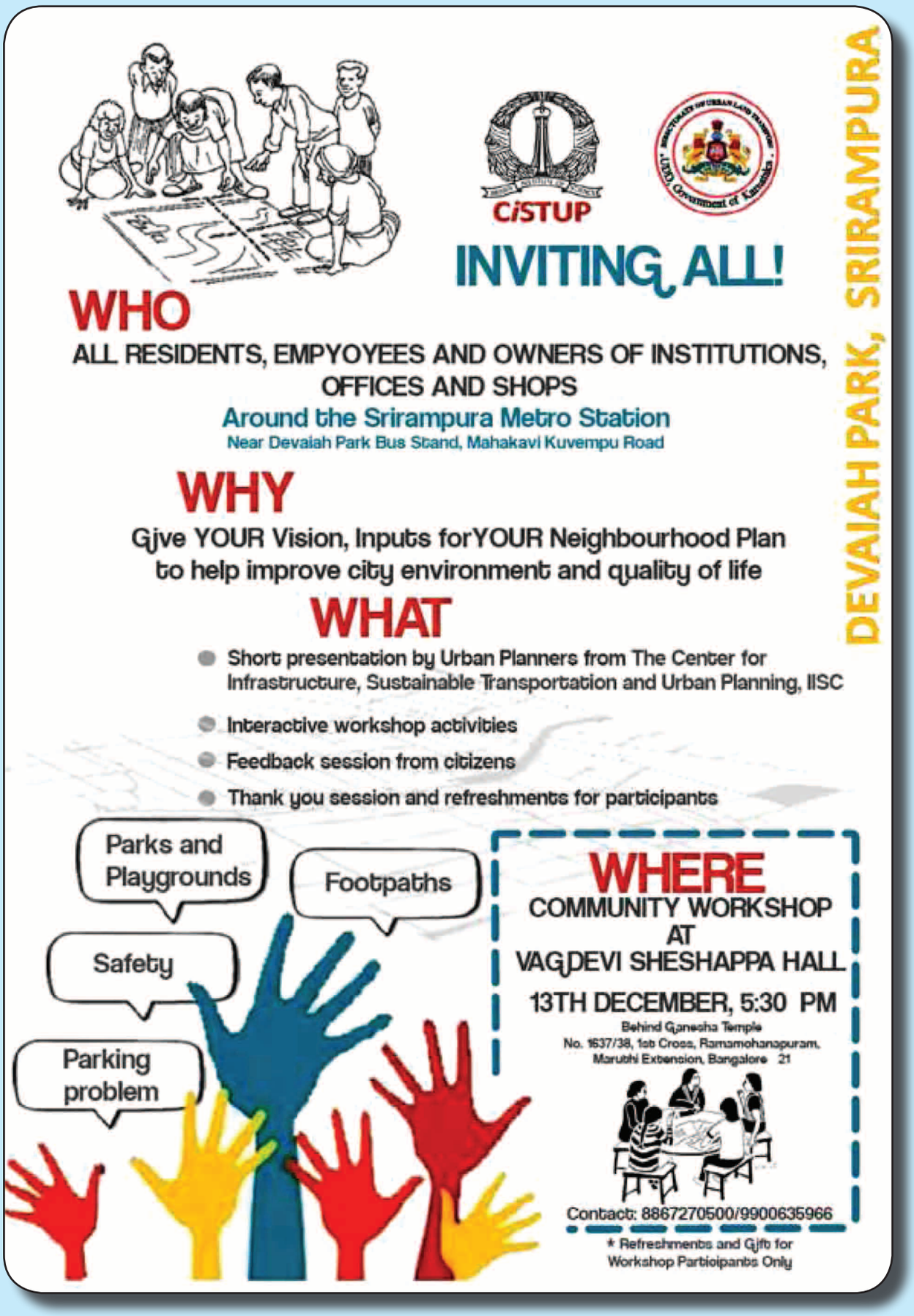
1. Prof. T. G. Sitharam, CiSTUP, IISc
2. Prof. K. B. Akilesh, Mgmt, IISc
3. Lokesh Hebbani, Planner, CiSTUP
4. Dr. Gururaja K. V., Planner, CiSTUP

**There were also quiz competition structured for the students and they also participated dynamically in the competition and also few Videos about the CiSTUP and activities were showed the students.**

## ACTIVITIES AT THE CENTRE

# Proceedings of the Community Workshop

**Date: 13.12.2013 Time: 5:30pm - 7:30pm, Venue: Ramamohanpuram, Bangalore**



**Attendees:**

From CiSTUP, Prof. T.G. Sitharam (Chairman), Mr. Satya Sai Kumar (Team Lead); Ms. Jaya Dhindaw and Ms. Radha Chanchani (Urban Planners)

From DULT, Mr. Shamanth Kuchangi (Head of TETC); Ms. Ritu, Ms. Madhu Singh, Ms. Sheeba Shetty, Ms. Sonal Kulkarni and Ms. Sylvia Prakash (Transport Planners).

Around 80 community members (residents, institution and business owners) attended the workshop, including the BBMP Corporator of the Gayathrinagar (Ward No. 76), Ms. Chetana Gowda.

The community was welcomed and introduced to the agenda of the workshop by Mr. Satya Sai Kumar, CiSTUP and Prof. T.G. Sitharam gave a welcome speech in Kannada. Following this Ms. Jaya Dhindaw, Urban Planner, CiSTUP made a short presentation on the analysis and findings from the study area, while Mr. Shamanth Kuchangi, Head of TETC, DULT translated the same in Kannada.

The presentation was followed by 3 workshop sessions, the details of which have been documented below:

**Workshop 1: Desirable/Undesirable Land Uses:**

Some pictures of the allowed uses were shown to the community members and they were asked if they preferred to see these uses coming up within their neighbourhood or not.

**Workshop 2: Visual Preference Survey:**

A Visual Preference Survey was administered where community members were asked as to what kind of built form they would like to see in their neighborhood.

**Workshop 3: Neighbourhood Issues and Vision:**

Lastly there was an open interactive session where community members voiced what they experienced or perceived as major developmental issues in the area. Finally, based on our studies and public input/interaction, a vision for the neighbourhood was formulated; agreed to and backed by the local community.

## CiSTUP FOUNDATION DAY EVENT-2014

# CiSTUP 5TH Foundation Day-2014



Registration

Welcome Speech


Inauguration


Speech From Chairman, CiSTUP


Speech From Dean of Engineering, IISc


Speech From Chief Guest, Mr. Anjum Parwez, IAS, MD of BMTC

Presentations

Networking Lunch


Panel Discussion/Vote of Thanks

## CiSTUP FOUNDATION DAY EVENT-2014

# About CiSTUP Foundation Day

CiSTUP foundation day is planned annually during the foundation day celebrations (2nd Jan) of CiSTUP. This year is the 5th year of Foundation Day. The workshop address issues, problems and solutions in the area of infrastructure, transportation and planning of our cities in India. Most presentations are carried out by scientists associated with our centre.

Foundation day started with the inauguration by chief guest Mr. Anjum Parwez, IAS, MD, BMTC, Prof. B. N. Raghunandan, Dean of Engineering, IISc and Prof. T. G. Sitharam, Chairman, CiSTUP,


The foundation day presentation was also organized where we had Professors, Faculties from different department of IISc and outside campus, Students, Urban & Transportation Planners and Project Assistants of CiSTUP who shared their ideas and thoughts regarding Transportation, Sustainability and also about the Urban Planning.

# Summary of the Project Presentations By Scientists Associated with Cistup

**Evaluation of the process in the implementation of Jawaharlal Nehru National Urban Renewal mission in Karnataka**

**Prof. Narendra Pani,** National Institute for Advanced Studies, Bangalore

In the absence of a comprehensive National Urban Policy statement the Jawaharlal Nehru National Urban Renewal Mission has emerged as virtually the sole representative of the official approach to urbanization. In the process of sanctioning projects to individual states JnNURM lays out an entire worldview of how urbanization should be approached. Through a series of reductionist steps it lays out a strategy for official intervention in the urban. It begins by identifying cities that need official intervention. It then expects the local bodies to come up with City Development Plans. Based on these plans a shelf of projects is to be created. These projects can then get JnNURM funds subject to the condition that certain urban reforms are carried out at the state level and at the level of local bodies.

The implementation of this approach throws up a issues at virtually every step of this strategy. How exactly should cities that have access to JnNURM funds be chosen? Should policy for each of the chosen cities have the same set of objectives and priorities? When City Development Plans are reduced to a set of specific projects, what determines the prioritization of these projects? What is the actual impact on the ground of reforms that are dictated from above? And several other such questions.

Using aspects of Karnataka's experience with JnNURM this talk will critically explore this approach to intervening in the urban, pointing to the many ways in which it misses the dynamics of Indian urbanization.

**Indicators of Urban Sustainability: Comparing Bangalore and Mumbai with Benchmark Cities**

**Dr. Balachandra .P,**
Management Studies,
Indian Institute of Science,
Bangalore

The study investigates whether the present pattern

## CiSTUP FOUNDATION DAY EVENT-2014

of urban development in India in the creation of mega cities is sustainable and what it can learn from the global megacities. This has been done by comparing the two Indian cities, Mumbai and Bangalore, with selected mega cities of the World representing different stages of development (Shanghai, London, and Singapore) using an indicator-based approach under a sustainability framework. Indicators play an important role in turning multidimensional as well as quasi-quantitative data into relevant information for policy makers and help in decision-making. They also simplify a complex and large information base and provide a "synthesis" view of existing situation. In particular, sustainability indicators quantify performance, providing clear and compelling measures of key trends in the environmental, social and economic systems, and human well-being.

In the present study, the prioritised indicators under the three dimensions of sustainability – economic, social and environmental – are included for comparing selected global mega cities. These indicators are then used for developing dimension wise sustainability indices as well as composite urban sustainability indices (USIs) for all the chosen cities. In the next step, these index values are compared with the hypothetical benchmark urban sustainability index values and sustainability gaps are identified. These gaps essentially represent the targets for achieving sustainable urbanization. The results indicate that compared to benchmark index values, both Mumbai and Bangalore have large gaps to bridge with respect to economic sustainability where as they are relatively better placed with respect to social and environmental sustainability. Among the five cities, Singapore emerges at the top with a high USI value, and Bangalore and Mumbai occupy the last two positions respectively. We believe that the indicator-based approach represent a primary tool to provide guidance for policy makers and to potentially assist in decision-making and monitoring local strategies/plans. The outcome of the study will contribute to the design of policies, tools, and approaches essential for planning to attain the goal of sustainable development and the social cohesion of metropolitan regions.

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**Assessing resource and energy demand attributed to modern urbanizing transitions in rural dwellings**

**Prof. Monto Mani,** Centre for Sustainable Technologies, Indian Institute of Science, Bangalore

Transitions in rural dwellings primarily deal with alterations and growth in line with modernity fuelled by economic prosperity. Given India's diversity in culture, environment and climate, rural dwellings are indicators of this local diversity. The dwellings not only reveal the local culture, but are also living remnants of the community life they support, their building skills and the local climate they weather. These dwellings are generally termed as vernacular and are masterpieces of low energy green architecture.

However, in the modernising world these are perceived as primitive or underdeveloped. There is a deep earning amongst the rural residents to adopt a more modern urban lifestyle. As dwellings reflect the earnings of its inhabitants, changing aspirations are revealed through new constructions and renovations to old structures. These alterations place a heavy demand on building resources that are not locally sourced, and may not be conducive climatologically. Consequently the energy for maintaining a comfortable indoor environment increases. Estimates for these are important as nearly 65% of India's population is rural, and a majority of these areas are under modernising transitions. These transitions are inevitable and needs to be addressed. The current presentation discusses these imminent transitions and challenges ahead.

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**Public Outreach for Bus Rapid Transit (BRT)**

**Dr. Vijay Kovvali,** Traffic Mobility Solutions, Bangalore

Enrique Penalosa, the Ex-Mayor of Bogota and the architect of the Bogoto's famous Transmillenio, BRT system, unequivocally states in his presentations that Bus

Rapid Transit (BRT) is not just the best solution for cities around the world, but is the only solution. So, why is it that in India there are so many challenges for BRT? Delhi and Pune BRTs are considered failures, and Ahmedabad BRT success is attributed to the political landscape. The high court decision on BRT in Indore has presented new challenges for BRT in India.

Most Indian cities have greater than 30% public transport share, which makes BRT a natural progression to facilitate better transportation for the city. Hence, it is important that we get this large percentages realize the need and benefits of BRT. Public outreach for BRT in India is a complex issue with many different challenges from land acquisition to creating mode shift. This presentation draws upon the initial work of IBI Group in Hubli-Dharwad and Pimpri-Chinchwad for planning public outreach for BRT in India. Audience segmentation, communication strategies, campaign plans and outcome monitoring will be discussed during the presentation.

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**Rethinking wastewater management and moving towards greater water security (with some sustainability thrown in)**

**Dr. H. N. Chanakya,** Civil Engineering, Indian Institute of Science, Bangalore

Conventional approaches to urban and domestic wastewater management approaches have almost always considered them as potential hazards, source of epidemics and something that needs to be hidden from sight – often rightly so. With the rapid urbanization of India, the emerging proximities of the new cities and towns, serious shortages of water and the general absence of a concerted way of collecting, conveying, treatment and discharge into safe uses (infrastructure), there is a need to rethink how to address this wastewater sustainably.

Today such wastewaters are discarded haphazardly and generally do not undergo appropriate treatment before final discharge into the environment. The proximity of the cities in a population dense country like India almost always creates a situation where one city's wastewater become the downstream cities' water source or pollutes the key surface water source to the downstream cities. Further as one goes downstream along the river valley, the pollution levels become stronger, less manageable and often problematic. This paper examines the current situation in two cities of Karnataka that are peppered with interlinked runoff harvesting water bodies along the drainage route and their fate after constant entry of wastewater into these water bodies. Our studies indicate that these water bodies have become sewage fed water bodies and eutrophied. However, considering that many of these water bodies are large and provide a significantly long residence times to partially or untreated sewage, water flowing out of these water bodies appear to be treated to near permitted discharge levels. However, as there is little need for irrigation water in cities (the original use for these water tanks) it is therefore possible to use these water bodies to purify water and avail such water for both secondary uses as well as for ground water recharge. This would almost halve the water required by the city. Another way to reduce the water footprint at the domestic level is to re-use grey water at a household level. Several studies have shown that between 60 and 75% of the wastewater discharged is grey water and is generally free from possible fecal contamination and therefore does not pose threats of epidemics etc. It is therefore a good candidate to treat and reuse at the domestic level itself because cultural and social issues deter mixing of grey water from multiple homes and its redistribution back to the houses for reuse. This barrier therefore requires that house level greywater treatment devices are evolved that are capable of uninterrupted function for periods greater than 3years. Reuse of grey water at the household level enables sustainable and comfortable lifestyles even at a water supply level at 50-60 litres per capita day (lpcd). The combination of the use of domestic level grey water purification and reuse devices as well as the use of existing irrigation tanks as tertiary 6 water treatment and ground water recharge devices will greatly reduce the water footprint of the emerging city dwellers and enable a much higher level of water security in years to come. This paper depicts the research and development outputs towards such a sustainable and water secure scenario.

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# CiSTUP FOUNDATION DAY EVENT-2014

**The Law and Policies Shaping the 'Urban in Karnataka'**

**Dr. Sudhira H. S.,** Gubbi Labs, Gubbi

In India, 'urban development' has been assigned by the Constitution as a State subject allowing respective states to formulate policies and legislations to govern and plan urban areas. Accordingly, the state of Karnataka has passed numerous laws and enacted subsequent amendments keeping in pace with certain changes. All of this, have been effectively influencing and shaping the 'urban' evolution in the state notably on planning and governance. The talk attempts to present the key laws, policies and notifications by the state. It will present how certain laws and notifications drive the institutions and also the limitations therein. It concludes by highlighting the key challenges and giving some pointers on way ahead.

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**A Methodology to Measure Indicators of Urban Sustainable Development in India: Case Study Bangalore.**

**Dr. Keya Chakraborty,** CiSTUP, IISc

Cities are the engines of growth, where human and economic activities evolved through a complex process determined by number of economic, demographic, social and historical factors. Indian cities are in the phase of reconstruction, in terms of both use and form. It is very important to address various complex urban issues associated with the present pattern of urban development. Additionally, to meet the growth patterns of cities there is a need to develop a well defined form of sustainable urban development. Attaining sustainable urban development is a serious challenge as it encompasses various issues viz. economic, social, and environmental aspects. Off late, increasing urban sprawl, poor infrastructure facilities, and inefficient institutional structures has created a sense of urgency to improve the quality of life now for the benefits of future generation. Thus development of a city needs to be planned, guided and monitored in order to achieve an optimum utilization of resources which will leads to attain sustainable living, socially habitable, economically efficient and administratively manageable. Bangalore, one such Indian city with global importance in Information technology and Bio Tech capital, has been chosen as a case study. The city is experiencing problems of inefficient infrastructural and socio economic planning drawbacks, needs a proper course of action in order to attain sustainability in a long run. Present study attempts to identify the extent of inequality of public service indicators of sustainable development within Indian city in comparison to world scenario. Further it tries to develop a methodology to measure indicators and parameters related to sustainable development, taking a micro level case study from Bangalore city. Finally it attempts to establish a sustainable index based on the chosen case study area.

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**Exploring Form-based Codes: A Pilot Study in Bangalore**

**Jaya Dhindaw, Radha Chanchani, Satya Sai Kumar, T. G. Sitharam,** CiSTUP, IISc

Current development controls typically use (among others), parameters like density and FAR to regulate built form. However, these prescriptions are often not in sync with the local context or ground realities and are easily and regularly flouted. Therefore, it is valuable to look at other ordinances, standards and best practices to determine if there is one that involves the community it affects, promotes predictability in outcome, meets the development and growth needs of the city, and is

transparent in its formulation and implementation. In this context, recent international studies indicate that Form-based codes (FBC) have the potential to offer a powerful alternative to conventional zoning. Form-based code is a regulatory tool that fosters predictable built results and a high-quality public realm by using physical form (rather than separation of uses) as the organizing principle for the code. They address the relationship between buildings and the public realm, the form and mass of buildings in relation to one another, and the scale and types of streets and blocks. FBC is community vision driven, so it relies heavily on public input and can be a good tool for community asset preservation. It focuses on holistic neighborhood/ block development and addresses economic, social and environmental sustainability. It is written so as to be easily understood and any future outcomes are transparent. The objective of this study was to explore the feasibility of implementing FBC in Bangalore and demonstrating its pros/cons over conventional practices. To this end the area around the Mahakavi Kuvempu Road Metro Station was chosen as a pilot study area.

The following salient findings emerged through detailed site study, surveys, stakeholder interviews, community interaction and expert consultations.

- Typically, FBC is a micro-level exercise applied to smaller areas, and follows the preparation and approval of a District or Local Area Plan, Revitalization Study, etc.
- The Srirampura Metro area has been experiencing a high level of growth and transformation since the past 2-3 years causing several issues such as traffic congestion, inadequate parking facilities, lacking pedestrian infrastructure, safety concerns, poor light and ventilation conditions due to dense development etc. leading to a poor quality of life due to the ineffectiveness of current regulations governing landuse and buildings.
- An integrated approach, looking at individual lots/ buildings in relationship with neighboring ones, public streets, spaces and the neighborhood is 11 needed. This should also integrate with other Master Plans, ordinances, design guidelines/ standards, etc.
- Public participation and community input are a key component of this process.
- The implementation, administrative and review process should be simplified, streamlined, clearly defined and transparent.

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**Who influences whom in Cities and Biodiversity?**

**Dr. Gururaja K. V.,** CiSTUP, IISc

Cities are growing with over half of world's population living in them and are the key consumption centres of the World's resources. Such growth has a greater influence on biodiversity in and around a city. However, the process of interaction between cities and biodiversity is poorly understood. Key decision makers and governing bodies generally live in cities. Their decisions have often influenced biodiversity in the city (Eg. creation of Lalbagh to cutting of trees for road expansion; creation of water tanks to restoration of lakes). Biodiversity too influence cities that include both tangible and non-tangible benefits like urban green spaces, blue spaces, ecosystem services and long term climatee stability to name a few. If citizens and policy makers are convinced of the importance of biodiversity, it can influence in better planning, designing and policy for livable cities. In this presentation, I will be explaining case studies involving biodiversity in blue and green spaces of two cities and how they influence conflict management.

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**Assessment Derived conservation strategies for major lakes of Karnataka– Bangalore Phase I**

**P. Jeya Prakash,** Environmental Management and Policy Research Institute, Bangalore

The project was completed during the period of 2012-2013 and the report was submitted to CiSTUP in the year of 2013. Major research findings of the study are, identification and documentation of existing and non-existing water-bodies (katte, kunteandkere), numbering and coding of water bodies, documentation of history and morphology of water bodies, study of hydrological profile, Landuse pattern analysis, transport network change analysis for the period of 40 years using Remote Sensing (RS) and Geographical Information System (GIS) technique, seasonal GPS mapping of water spread area of water bodies, water quality analysis, biodiversity assessment, identification and assessment of pollution sources, encroachments, threats to each water-body, analysis of health status of each water-body using Environmental Impact Unit (EIU). Lake Health Report Card (LHRC) was prepared for 117 water bodies located in 33 villages which are at different stages of development viz; already developed area, Sir M. Visweswaraya Layout (SMVL), developing area, Nada Prabhu Kempegowda Layout (NKPL) and Green Belt (GB).Apart from this, the derived conservation strategy for water-bodies has also been strengthened by the involvement of both primary and secondary stakeholders. The conservation strategies were formulated under six heads such as lake land protection, pollution control, lake restoration, community participation, legal framework, water management planto safeguard the water-bodies in Bangalore.

2. This is one of the ongoing projects funded by CiSTUP. The concept of the project is based on WHO (World Health Organization) procedure for Water Safety Plan (WSP). The objective of this project is to undertake a pilot to understand the possibilities and systemic requirements to consistently ensure the safety and acceptability of drinking water supply in particular to ward no 90 (Halasur) and ward no 91 (Bharthi Nagar). The study also expects to assess water safety at various points in the system (Catchment to Consumer - C2C) by strategising mitigative and adaptive actions. The project will assess and analyse all the steps in water supply system from catchment to consumer (C2C) by giving proper remedial actions to eliminate all the possible risks of contamination. The study will also identify the hazards, hazardous events, prioritization of risks, providing appropriate 15 control measures to reduce risk of contamination at different levels (source, distribution and storage at user end). The basic data and water sample collection for both summer and monsoon season has been completed. The analysis of summer season data is completed and results for monsoon season is awaiting. Health survey is also completed for both the wards. Household survey regarding hygiene practices, cost and trust on BWSSB water, etc. is in progress. Ward wise detailed survey (distance between water supply line and sewer line, Vehicle pressure on buried pipes, GPS location of existing and updated bore wells condition assessment of public taps, bore wells, hand pumps and mini water supply tank etc.) is in progress. 60% of the work is completed. After completion of analysis, interpretation and validation of the data, the final report would give a complete scenario of the water supply system and remedial actions to be taken to provide safe drinking water to these two wards.

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**Stabilization and Protection of Storm Water Networks and Waterways in Flood Mitigation and Water Securitization**

**Vivek Menon,** INVICUS, Bangalore

The prime objective of this presentation is to analyze and provide clear direction in the stabilization and protection of our storm water networks, waterways, channels, rajakaluves and lakes in flood mitigation and water securitization. The core philosophy of this initiative will hinge around sustainability and ensure the following:

1. Meets the needs of the present without compromising the quality of life of future generations.
2. Maintains economic growth while producing an absolute minimum of pollution, repairing environmental damages of the past, producing less waste, and extending opportunities to live in a pleasant and healthy environment.
3. Meets human needs by maintaining a balance between development, ecology, and economics.
4. Has optimal benefit only when addressed at the inception of a project, and throughout the entire

life cycle of a project - from concept to planning, to programming, design, construction, and ownership.

The processes, procedures and direction represented in this presentation shall apply to all the storm water networks, waterways and natural channels connecting the lakes within the jurisdiction of the Bruhat Bengaluru Mahanagara Palike (BBMP), the Bangalore Development Authority (BDA) and Bengaluru Metropolitan Regional Development Area (BMRDA) and shall be governed by the Comprehensive Development Plan 2015 (CDP 2015).

This presentation shall address the following critical areas:

1. The Comprehensive Development Plan 2015 (CDP 2015) and its influence on the waterway corridors.
2. Lake Characteristics in flood mitigation and water securitization.
3. Sewage Management as it relates to contaminants within the current system and ways to mitigate their entry into the waterways.
4. Hydrological Engineering and Hydraulic Modeling to demarcate linear zones of influence within the waterway corridor.
5. Determination of Valley Zones as it relates to land use planning and flood mitigation.
6. Land Sensitivity and its impacts.
7. Lake Conservation.

A vision for the Waterways corridor The following paragraph attempts to both define the waterway corridor in a philosophical sense but also encapsulate an aspirational vision applicable to all the waterways.

1. The waterway corridor should be the pride of the city and in doing so shall also serve as lifelines in flood mitigation and water securitization as it applies to future growth within the city.
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3. The waterway corridor should be the pride of the city and in doing so shall also serve as lifelines in flood mitigation and water securitization as it applies to future growth within the city.
4. It should provide an opportunity to maximize the potential of the lake system in Bangalore while ensuring that growth within the city is not hindered but merely managed in an efficient and effective way.
5. The corridor should be managed to protect valley zones defined in the CDP by ensuring that proper hydrological and hydraulic modeling is used to optimize and demarcate the linear zones within which development shall be planned.
6. The waterway corridor in certain planned stretches shall be an amenity for all which provides waterside settings and activities, navigational access and facilities, wildlife refuges and habitats, accessible where appropriate by foot or boat, and emotional sustenance.
7. The waterway should be managed and protected in partnership with the adjacent landowners and local communities to ensure it remains a sustainable resource to them and their descendants and a showcase of sustainable environmental quality management across the world.

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**Water Sensitive Infrastructure - Towards Sustainable Cities**

**Mohan Kumar M. S.,** Department of Civil Engineering, Indian Institute of Science, Bangalore

Population growth, urbanization, rapid industrialization and depleting water resources due climate change are leading towards high stress on water infrastructures around the world. Urban cities are striving to manage their water resources ailing due to aging infrastructure, distant water sources, inefficient operation and management etc. which requires systematic and scientific technologies like urban catchment management, storm water management, aquifer storage and recovery, rain water harvesting, bio-retention systems and decentralized waste treatment systems with which a city can react well towards any change. In this paper we are reviewing existing methods and success stories by adopting these technologies in Integrating urban water Cycle

management into urban design and making cities a true urban ecology. Integrating some of the relevant technologies for Indian cities can make them truly sustainable.

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**Light Rail Transit for Mysore City**

**Gargi Ghosh,** Sky Group, Bangalore

Achieving sustainable urban transport has become a primary objective with the adoption of National Urban Transport Policy (NUTP) by the Government of India. The Ministry of Urban Development (MoUD)which is a nodal Ministry dealing with Urban transport has initiated a number of projects with the aim of completely transforming the urban transport scene in India. Till recently Metro Rail and BRTS have been the two modes of mass transport that has been focused.

The MoUD in 2013 has called for evaluating the feasibility of adoption of Light Rail Transit (LRT) as a part of integrated multi modal transport system in medium sized cities in India (1 -4 M population) like Mysore, Nagpur, Kochi etc. with the likely possibility to be funded under JnNURM 2. Taking cue from the government interest, we have evaluated the towns in Karnataka for their feasibility of adopting LRT as a mass transit mode. The twin cities of Hubli - Dharwad (9.4 lakh, census 2011) and tourist city of Mysore (8.9 lakh, census 2011) qualify in term of the population.

Mysore is located in the state of Karnataka with a geographical area of 128.42 sqkm and population of 9.83 lakhs. It is a major tourism destination drawing 13.4 lakhs tourists annually which contributes to 25% of the GDP. It is also being planned as an alternative IT destination acting as a counter magnet to Bangalore. As Mysore emerges as a major growth node, it becomes indispensable to plan for its sustainable growth. For the present study, Mysore has been selected due to its good road network and growth potential.

LRT system is a medium capacity rapid transport mode (10000-30000 phpdt) that runs on designated or shared pathway. It is environmentally unobtrusive, electrically propelled, operating on available rail or road RoW & street median, cheaper, less disruptive that make it particularly well suited to medium sized cities where heavy rail systems cannot be economically justified.

The study establishes the feasibility of Light Rail Transit in Mysore city in terms of travel demand, engineering feasibility and cost effectiveness. Literature study, secondary data collection and primary reconnaissance study has been undertaken to understand the urban morphology, activity distribution, passenger profile & travel pattern in the city. Origin - Destination data and Travel demand data analysis establishes distinct demand corridors in the city with daily volume of 10,000 to 30,000 phpdt ideally suited for LRT. The road network analysis shows availability of adequate RoW suitable for tramway construction with shared pathway. The study explores the technology domain for rolling stock, track, power, stop and ticketing and arrives at solutions suitable for Mysore. A tentative cost estimate of 980 crores for the first phase of 19 kms has been worked out. Value capture, potential ridership and traffic.

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**Road Safety Scenario in India – Problems and Solutions**

**Lokesh Hebbani,** CiSTUP, IISc

We all know that “Speed Thrills but Kills” but still we want to speed in our daily life. The deadly game of hunted and hunter is daily played on Indian Roads with the big vehicles playing the role of hunter and the vulnerable section and smaller vehicles being hunted. Everybody if given a choice would like to be in the biggest vehicles as they generally own the road literally.

You may be surprised to know that nearly 1,43,000 people get killed on Indian Roads on yearly basis, or nearly 392 people getting killed on daily basis. There is always a human tendency to underreport undesirable facts. In our country, it’s the number of accidents which often fails to get registered. Human Death due to its complexity cannot be neglected and thus often gets registered. Experts have researched and indicated that a ratio of 1:15:70 for road accident deaths, injuries

requiring hospital treatment, and minor injuries. Thus it indicates that nearly 12 million people "Directly-influenced" by accidents. The persons who are only injured are "blessed" and they know that things could have been either way.

Have we ever bothered to find why we have so many accidents? Do we have a way out? Is the situation improving as many believe? Let us try to move out of philosophy that accidents are unavoidable. Yes, they are! Western countries are using this philosophy in Vision zero, where they plan to make roads which cannot cause any fatalities. We have solutions that can be implementable with the full support from our law makers who can come up with strong political will.

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**Implementation Of Bus Rapid Transit System (Brts) In Hubli-Dharwad- An Overview**

**Veena Nirwani,** Directorate of Urban Land Transport, Bangalore

The twin cities of Hubli and Dharwad are located about 20 km apart in northern Karnataka. Hubli-Dharwad is a single Municipal corporation with a n extent of 202 sq km. As per 2011 census, the population is 0.94 million - making Hubli-Dharwad the second largest conglomeration in Karnataka. Hubli is known as the commercial and business hub of the region and Dharwad is the administrative seat of the District and a educational centre.

The BRTS Project is a World Bank-GEF assisted Sustainable Urban Transport Project (SUTP). The BRTS project will connect Hubli CBT to Dharwad CBT, a length of 22.25 kms. Hubli-Dharwad BRTS project is a Government of Karnataka initiative to foster long term economic growth in the region by keeping the congestion in check along the Pune - Bangalore road corridor. It is being implemented by a special purpose vehicle, Hubli-Dharwad BRTS Company Limited (HDBRTSCO).

The proposed Bus Rapid Transit (BRT) system will not only transport the 1.75 lakh daily passengers currently using the buses on this corridor, but will also provide safe and efficient alternative for the private vehicle users travelling on this corridor. The estimated cost of the project including land acquisition is 692 crores. A World Bank loan of USD 55 Million is available for the Project.

Bus Rapid Transit is a cost-effective and suitable solution for cities with the urban form of Hubli-Dharwad. There are issues and concerns relating to current bus services in Hubli-Dharwad like overcrowding, lack of safety, non adherence to schedule, over aged buses etc. The BRT is planned to address many of these concerns plaguing the current bus service in Hubli Dharwad. These include: (1) clear, comfortable buses, (2) spacious bus shelters, (3) travel times that are comparable to private vehicles, and (4) traveller information (5) good frequency.

The length of the proposed BRTS corridor between Hubli and Dharwad is 22.25 kms. The corridor consists of 35m and 44m cross sections. The corridor consists of four lanes dedicated for BRT with 4m wide central median for BRT stations, four lanes for mixed traffic lanes abutting the BRT lanes, foothpath, landscaping zone and utility lane. In the 35m cross section in the city areas the BRT would have only three lanes.

HDBRTS features include dedicated BRT lanes, high quality articulated and standard buses; spacious, accessible, median bus stations; level boarding; off-board fare collection; bus service planning; Intelligent Transport Systems (ITS), and Passenger Information Systems (PIS). The Project also includes comprehensive development of the public infrastrucuture support facilties like Depots, Terminals and workshops.

**Status of the Project:**

The Construction of the BRT Corridor is complete for the stretch of 8.2 Km. The construction of mixed traffic lanes will commence after the completion of Land acquisition process. Around 70 acres of land is required to be acquired for the construction of the mixed traffic lanes. The land acquisition is being done under the Karnataka Highways Act. The compensation for the land acquired will be through consent award. A negotiation committee under the Chairmanship of DC, Dharwad is set up. The negotiation committee meetings with land losers are being held. The JMC survey is complete. The Resettlement Action Plan has been prepared as per the

World Bank policies. Public consultation meetings and focus group meetings are being held regularly.

Work has been awarded for the construction of BRT depots at Hubli and Dharwad and Divisional workshop at Hubli. Bids received for the construction of terminal at OCBS Dharwad and Depot and Regional terminal at Hosur are being evaluated. Tenders for construction of median BRT bus stations will be floated shortly. The BRTS operations are scheduled to start from mid 2015.

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**Growth of Infrastructure in Our Cities – Issues, Problems, Solutions**

**Harish M and N. Ramesh Babu,** CiSTUP, IISc

The Garden City of Bangalore is growing in leaps and bounds. The population as well as the vehicular population is increasing. This is due to the growth of Information Technology (IT), Biotechnology (BT), Business Process Outsourcing (BPO), Information Technology Enabled Services (ITES) Sectors and also Educational Institutes and Research Centres. Bangalore is India's fifth largest city and India's fifth largest

metropolitan area with the population of about 85 lakh as of 2011. The area of Bangalore city has increased from 69 sq.km in 1949 to 741 sq.km in 2007 and the total area under the Bangalore District is about 2,190 sq.km. The vehicular population in Bangalore City has increased from 1,75,325 in 1980 to 41,72,062 in 2011. The increased growth in vehicular population has lead to congestion which has made the authorities like BBMP and BDA to construct vehicular underpasses and overpasses to ease the vehicular congestion and also pedestrian underpasses have been constructed for the pedestrians. A study has been done on these vehicular overpasses, vehicular underpasses and pedestrian underpasses. As per the study some of these infrastructure facilities have not been designed as per IRC standards and also these infrastructure facilities have not been maintained properly because of which they are being underutilized. After the study some solutions have been given which may help in better utilization of the infrastructure facilities in Bangalore City.

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**Transport Scenario in Indian cities**

**Deepak Baindur,** Indian Institute for Human Settlements, Bangalore

Indian cities contribute more than 60% of the GDP to the Indian economy. By 2030, the figure is estimated to grow to approximately 70% (IUT, 2012)1. It is envisaged that future economic growth will come from industrial and service sectors and these sectors primarily take place in urban settings. And therefore, the smooth mobility and accessibility of Indian towns and cities is crucial for the sustained growth of the Indian economy in the future.

Urbanization is expected to grow rapidly and it is forecasted that urban population would be touching 40% by 2040 i.e. about 600 million people would be living in urban areas (IUT, 2012). However, like many low - medium income developing countries in Asia, Indian cities suffer from common issues of exponential increase in private vehicular traffic especially 2 wheeler traffic, road congestion, high road accident rates, poor road infrastructure, inadequate Public Transport services and lack of support for Non-Motorized modes of transport, poor public finances, fragmented institutional structure amongst others. Although the Indian Government has framed the National Urban Transport Policy and released public funding sources like the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) program and encouraged private participation, there continue to exist increasingly complex challenges in the urban transport scenario in India. Unless cities satisfactorily address urban mobility issues, it is feared that the country would not be able to maintain the economic growth that it enjoyed in the past. For cities to remain the engines of economic

growth, sustainability in the urban transport system has been identified as one of the main challenges that need to be addressed urgently.

This presentation will commence with a definition of sustainable urban transport system and its relevance to Indian cities. It will be followed with an overview of the urban transport scenario in India through a set of key transport indicators giving insights of its trends and key factors responsible for the observed trends. The presentation would identify the key challenges facing the urban transport system in India and appraise the major policy and planning decisions carried out and envisaged by the Ministry of Urban Development, Government of India and Planning Commission. From the insights in international case studies, the presentation will conclude with remedial measures towards enhancing land use transport planning, integrating urban transport facilities and operations, streamlining urban institutions and governance frameworks readjusting legal and regulatory frameworks and realigning transport investments as quintessence for sustainable urban transportation planning and policy in India.

**Commuter Rail System Bangalore**

**Sanjeev V Dyamannavar,** Praja, Bangalore

Mass transit systems that can move very large number of people quickly over long distances are the only solution to address the demands for the fast growing METRO cities with increasing mobility needs. Only rail based transit system provides a congestion free solution. Though there are multiple rail based transit solutions like METRO, MONORAIL, LRT, but 'Commuter Rail' system using the existing rail infrastructure will provide a better, smart and economic option over all others to connect urban and suburban areas.

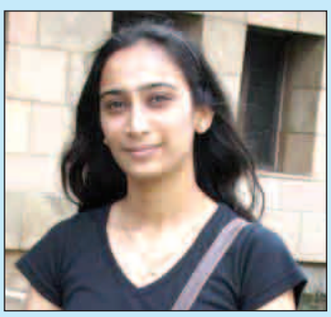
Bengaluru's urban and suburban mobility can be addressed with Commuter Rail system using the existing railway infrastructure that criss-cross the city centers and connects to suburbs and towns around it will account for almost 2 million commuter rides per day. This not only helps residents living in city to make use for their daily commute inside/outside of the city, but it will also provide a reliable mass transit system for people living in suburbs and towns to reach city center within 60-90 minutes travel time and frequency of train every 10-20 minutes. The affordable PT choices will also open up the opportunities for people in catchment areas beyond city limits to access educational, recreational, health care and social engagements.

Proposal for implementing 'Commuter Rail Service' in Bengaluru should get implemented in next 6-12 months once the approval from Railway Board accorded and currently RITES in the process of submitting the DPR. The proposal for this Commuter Rail service has been largely based on the study conducted jointly by the Center for Infrastructure, Sustainable Transportation and Urban planning (CiSTUP) and the citizen's group 'Praja-RAAG'.

Planned Commuter Rail services for Bengaluru will utilize 440 Km of Existing Indian Railway tracks and railway infrastructure in 8 directions around Bengaluru covering 7 Districts of Karnataka and providing with latest state of the art EMU coaches. This requires up-gradation of existing Indian Railway Infrastructure around Bengaluru to meet both own Indian Railway requirements and Commuter Rail services. This project is planned with investment of Rs. 9000 Crore for the 3 Phases over the period of 5-6 years. As the 60% of planned project investment will go into Railway infrastructure up-gradation which will help Indian Railway to run efficiently Commuter Rail Services along with Intercity Trains, Goods Trains by enhancing their own capacity by more than 50%.

**Mentorship in Implementing Comprehensive Mobility Plan (CMP) Action Plans of Tier II Cities in Karnataka: Tumkur City Pilot Study**

**Jyothi Chava and Pooja Rao,** CiSTUP, IISc



The study is funded by DULT. It includes methodology adopted for selecting the pilot corridors to implement CMP proposed projects and the analysis of various parameters to identify traffic and transport-related issues and gaps on the study corridors. The parameter analysis includes Existing street cross-sections, Current traffic characteristics, Public transport coverage, Pedestrian facilities, Traffic management (markings and signage) measures, Parking characteristics etc. Based on this identified issues and gaps, the present study is proposing conceptual plans and cross-sections for implementing CMP Action Plan and additionally identified proposals to achieve the objective of well integrated and sustainable transport system within the study area.

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**Namma Cycle - Sustaining Bicycle Sharing: Operations, Challenges and Learning's**

**Murali HR,** Namma Cycle and RACF, Bangalore

Namma Cycle is the Bicycle Sharing System being operated by Ride A Cycle Foundation in Collaboration with CiSTUP, Gubbi Labs and EMBARQ as Partners. Namma Cycle has currently 100 cycles with six stations. The program has completed around 18,000 trips in a matter of 18 months with 40% usage by visitors of IISc. The Challenges of operating such a system are many, but the basic challenge is to make it financially sustainable.

**Challenges**

1. Making the program financially sustainable for the past one and half years. Finalizing the Cost, Funding and Operational Models.
2. Designing and Branding Namma Cycle - Station Design, User Interface and Check-in/Check-out Protocols. Namma Cycle was able to design a simple and easy registration process.
3. People Management and instilling a sense of discipline in the people to manage the operations.
4. Tracking the Rental Cycles. Android enabled mobile phones were introduced to track the bicycle rentals.
5. Pricing Structure: A major barrier to the financial sustainability and growth of Namma Cycle is how we price it and how we get more people to use the system.
6. Bicycle Fleet Management and Maintenance: To reduce the bicycle breakdown, bicycle quality issues. A key aspect of Namma Cycle Program is bicycle fleet maintenance and management. Maintenance is a crucial functionality that ensures that the bike share system is in top operating order and sufficient good quality bicycles are available to accommodate all users. Two mechanics make sure that all cycles are in good condition. Also during peak time the bicycles need redistribution.
7. Redistribution: To ensure that bicycles are available at all stations, bicyclesare redistributed from one station to another consistently. We have also experimented with building trailers to carry bicycles.

**Key Learning:**

Bicycle Design is important - Damage resistant locking mechanisms coupled with adjustable bicycle seats are a priority. Process of Designing a Bicycle is started.

- Adequate Training for operations team and managing Human Resources are critical. Look out for Sponsors and get the show going with adequate funding.
- Improve the Technology further to reduce operational cost from 10 lakhs to5 lakhs.
- Improve the Rental Process by introducing the NFC card. This will reduce the rental transaction time from 30s to 5s.
- Real time display of Bicycle Availability.

**Summary**

Bicycle Sharing is a complex process, but if implemented in the Indian Cities can act as remedy for many of the ills plaguing our transport system. It is today a essential system for Indian Cities.

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**Urban Land Transport Database Needs and Structure – a Case of Singapore Land Transport Authority.**

**Satya Sai Kumar and Koti Reddy,** CiSTUP, IISc

Urban Land Transport agencies have been set up by the various State Governments under the Urban Development Department with objective to coordinate planning and implementation of Urban Transport projects and programs. This agency is in general responsible for overseeing all the urban land transport initiatives in Urban/ Local Planning Areas of the respective State. They act as a nodal agency to store and disseminate data related to transport and land use. In this connection a comprehensive central database repository in order make the information available across to all respective line agencies, general public and other stakeholders rather than built such data in silos is crucial. In fact, as part of National Urban Transport policy the concept of Land Transport Authority borrowed from the successful example of Singapore Land Transport Authority (LTA).

In this context, Directorate of Urban Land Transport (DULT) of Government Karnataka had assigned CiSTUP to recommend DULT Database Structure and its operationalization strategies. Therefore the current study reviewed the Data elements and Data structure of Singapore LTA to identify and define a DULT Database Structure, Data Needs, DULT Interactions, Scope and Purposes based on the best practices as required. Primarily, such Database helps to avoid re-inventing the data and making it easily accessible for information. The objectives of the planned centralized data repository are broadly identified as below:

- To minimize the duplication of data collection/map development
- To facilitate sharing of data across agencies
- To facilitate coordination of information/reports across agencies
- To facilitate selected access of information or reports to general public

This is currently an ongoing project and the presentation is a work-in-progress with key highlights on Singapore LTA Database.

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**Land use and Transportation Station Area Plans (LTSAPS) for Bangalore Metro - Transit Oriented Performance Recommendations.**

**Laxmi Nagaraj,** CiSTUP, IISc

This report explores how the newly introduced metro rail will contribute to solving the overall transportation issues in Bangalore, Karnataka, India. The motivation for this report is to determine: - Whether the projected ridership for the newly introduced metro rail can be realized with the existing and proposed transportation network - Whether the existing land uses around the metro stations and the recommendations of the Bangalore Master Plan 2015 achieve the desired land use optimization along the metro stations for achieving the desired ridership for the metro rail and other public transportation systems.

Site visits to 15 metro stations for the Bangalore Metro, Phase 1, were conducted to analyze the existing land uses and transportation facilities and determine whether densification can occur around the stations. The site visits concluded that the opportunities for additional densification, multimodal connectivity and walk ability are varied around the metro stations.

The transit oriented performance analysis concluded the following:

- the desired density of uses around the metro stations cannot be achieved by the requirements of the Bangalore Master Plan 2015
- the transportation connectivity around the metro stations is not fully developed to encourage a modal shift from private vehicles to the metro

## CiSTUP FOUNDATION DAY EVENT-2014

- adequate facilities for walkability are not fully developed

- a lot of the existing established uses are likely to remain for a long time

Given the diverse nature of land uses in Bangalore, the design principles for creating and encouraging Transit Oriented Development (TOD) around the metro stations in Bangalore will have to be customized for the existing areas that the metro will serve. Therefore, detailed station area plans must be developed for each station for integrating land use and transportation. The plans must include recommendations for land use and transportation connectivity and must serve as an integrated land use transport station area plan (LTSAP).

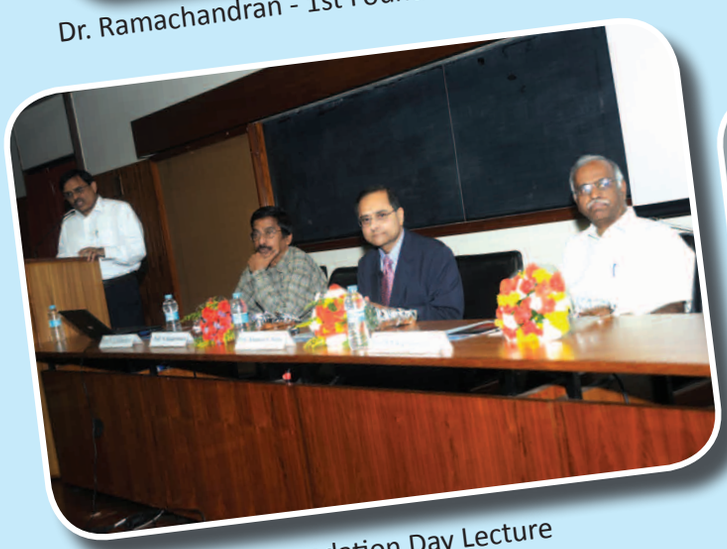
The agency/agencies responsible for the land use and transportation station area plans (LTSAP) must develop, implement and enforce the integrated plan. The 500 meter around the metro stations must be developed for integrated land use and transportation connectivity. The 500 m area around the metro stations will be referred to as the LTSAP area. The main aim of the LTSAP must be to minimize private vehicle dependency and promote public transit ridership in the areas around the metro stations. The report

includes general, specific and design recommendations for developing, implementing and enforcing the LTSAPs and recommendations for Bangalore Metro Phase II LTSAPs. An example of how a LTSAP can be developed is given for the Jayanagar Metro Station.

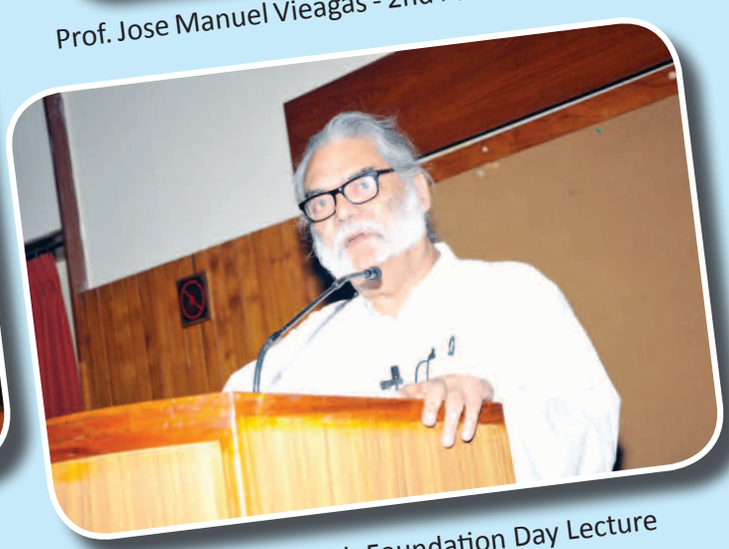
## CISTUP FOUNDATION DAY LECTURE SERIES

Dr. Ramachandran - 1st Foundation Day Lecture

Prof. Jose Manuel Vieagas - 2nd Foundation Day Lecture



Prof. Sinha - 3rd Foundation Day Lecture



Porf. Dinesh Mohan - 4th Foundation Day Lecture

CiSTUP participation in External Activities

# Indo-German Biodiversity Programme-Conservation and Sustainable Management of Existing and Potential Coastal and Marine Protected Areas (CSM-CMPA)

**Date: 27th October to 1ST November 2013,Venue: Germany**

As a part of the Indian delegation the Indo-German scientific Cooperation Study Tour & Start-up Workshop from 27th October to 1st November 2013 in Germany.

## The objectives of the visit:

1. To get an overview of state-of-the-art research initiatives in Germany in relation to the assessment and conservation of biodiversity in the marine environment.
2. To get introduced to examples of the management of marine parks in Germany with an emphasis on international collaboration.
3. To identify areas of scientific cooperation during a high-level meeting of Indian and German scientists and initiate the necessary process for Indo-German scientific cooperation on topics related to the conservation and sustainable management of biodiversity in coastal and marine areas.

In this exposure tour, there was discussions and deliberations with Scientists from various German institutes. To name a few,

1. Dr Klaus Janke, Head, Hamburg Wadden Sea National park
2. Prof. Detler Stammer, Director of CEN, University of Hamburg
3. Prof. Fouquet, President, University of Kiel
4. Prof. Thorsten Reusch, Head of Research Division, Marine Ecology, GEOMAR .
5. Mr Axel Benemann, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety.

During this visit they had also visited Hamburg harbour; University of Hamburg/Center for Earth System Research and Sustainability; University of Kiel; Institute of Geography; GEOMAR Helmholtz Centre for Ocean Research, Kiel; GEOMAR Aquarium; Zoological Museum, Kiel; Wadden sea to the island of Neuwerk; and ZMT (Leibniz-Zentrum für Marine Tropenökologie), University of Bremen.

# CiSTUP participation in External Activities

## 4th GRIHA Regional Conference on Innovations in Sustainable Buildings, By TERI 15-16 Nov 2013, Bangalore

**Date: 15th November to 16th November 2013-12-31**
**Venue: Domlur, Bangalore**

CiSTUP is represented by Mr. J. Satya Sai Kumar, Senior Planner and Team Leader in this event by presenting in two sessions.


On 15th November 2013 Mr. Sai Kumar gave a talk on "Green Urbanism: Emerging Sustainable Innovations" as part of the Green City Session.

On 16th November 2013, Mr. Sai kumar got invited as Panel Member to talk on Career Options in Sustainable Habitats sharing the panel along with the Principal from RV College and also Director of BMS Architecture College.

## Robert Bosch Engineering and Business Solutions Limited Technology,

**Event: "TechnoBiz 2013" Date: 23 Sep 2013,**
**Venue: Bosch Seminar Hall, Bangalore**

At the invitation of the Robert Bosch Engineering and Business Solutions Limited (RBEI), Mr. Lokesh Hebbani, Transportation Program Manager, provided a guest lecture during their Technology Event called "TechnoBiz 2013", on September 23, 2013 at **Bosch Seminar Hall (130), Koramangala, Bangalore, India.** The topic of his lecture was "**Urban Mobility in Developing Countries: Need for a Paradigm Shift"**

### About Bosch Lecture Series:

Bosch has many focused programs for organization and employee development. In persuasion of providing various platforms for expanding the perspectives of their associates (RBEI employees), lectures on topics typically not directly related to work, but which can trigger thought processes in the associates and make them more accountable for themselves, for the company as well as the society.

**This is done through an inspiring talk by expert, Mr.Lokesh Hebbani followed by an opportunity for a dialogue between the expert and the associates**. This was held at their Bangalore campus, and is well attended by hundreds of their associates including senior management.

## UKIERI WORKSHOP ON "CONTAMINANT MONITORING IN THE ENVIRONMENT"

**Date: 5th November 2013**
**Venue: Department of Aerospace Engineering,**
**Indian Institute of Science Bangalore**

Mr. Lokesh Hebbani, Transportation Program Manager made a presentation at UKIERI WORKSHOP ON "**CONTAMINANT MONITORING IN THE ENVIRONMENT** " held at Department of Aerospace Engineering, Indian Institute of Science Bangalore on 5th November, 2013. The topic of his presentation was '**Air Pollution due to Transport Sector".** The workshop was organized by following partners:


**Abstract:**

Rapid Urbanization and growth of motor vehicles impose a serious effect on human life and its environment in recent years. Most of the Cities of India are being suffered by extremely high level of urban air pollution particularly in the form of CO, SO2, NO2, PM (Particulate Matter) and RSPM (Respirable Suspended Particulate Matter). Transport sectors contribute a major share to environmental pollution (around 70%). Among these pollutants CO is the major pollutant coming from the transport sector, contributing 90% of total emission. The presentation highlighted the contribution of Transport Sector to air pollution and its relative health effects on us. It also suggested the effective strategies that can be implemented to reduce air pollution due to Road transport sector.

## 30th International Supply Chain, Indo - German Logistics Forum, 25th October 2013

**Date: 25th October 2013 Venue: Berlin**

A fundamental idea behind the International Supply Chain Conference is and was to disseminate publicly logistics knowledge of experts to the general public. From the start, establishing a platform for making business contacts and initiating business deals played an important role. At no other event in Germany the "logistics market" is as within reach as at this conference. Since 1985 it is also accompanied by a trade exhibition and the number of stands has increased tenfold from 20 to around 200. Furthermore, a multiplicity of meeting points and corporate lounges enrich the possibilities to do and see.

Today the International Supply Chain Conference is the most important annual logistics event in Europe. It became the central meeting point for managers in Germany. Additionally, more and more international guests join the event in order to benefit from knowledge sharing and focused communication.

The International supply chain conference has been mirroring the rapid development of logistics and supply management for 30 years now and servers as an annual forum for the interdisciplinary exchange of ideas and information .

The 3 days of conference let the participants be impressed with the innovative drive of the logistics sector and take new ideas with participants for their daily work.

The conference also had 4 tracks and they were as follows:

### ➢ Innovation:

The competitiveness of a country, a sector or a company depends large were on its ability to innovate. This calls for the creative ideas when addressing topics that are of central relevance for the future. What innovations are being developed in logistics, Supply chain management and information technology?

### ➢ Sectors:

Logistics is a cross-sectional function and a decisive success factor spanning entire sector of industry-and it is of key importance both within companies and as a cross-company activity. The focus is on models to meet current logistical challenges in different sectors.

### ➢ Networks:

Well-structured networks are a key success factor, both in managing the complexity of flows of goods and information and for co-operation between companies and across national borders. How can these increasingly integrated networks be efficiently controlled and optimized.

### ➢ Ideas:

Social change, scientific progress and business success all begin with an idea and the courage to put this idea into practice. The sequence will present future oriented projects from the media, research, industry and humanitarian logistics.

It was great opportunity that Prof. T. G. Sitharam made a presentation on "**Logistics Sector In India: Present Scenario and Way Forward".** The wrapping up of the presentation had few of the points as follows:

- The key idea for sustainable freight transport is "to use road transport only when it is necessary".

## CiSTUP participation in External Activities

- The development of freight centers concurrently with increasing the use of the more environmental friendly modes (including rail waterway freight centers and consolidated deliveries provide a way to reduce the number of truck trips entering rail, waterway, and cities. coastal transport); especially, for long distance deliveries.
- Development of Multimodal freight facilities to support the flexible connection between railways, waterways, and coastal facilities, and concurrently increasing their capacity.
- Most policies have different impacts on freight operators, the wider economy, and the environment, governments must choose where their priorities lie.
- In city, road transport seems only delivery method attractive to transport operators due to its flexibility. The policies of urban freight centers and consolidated deliveries provide a way to reduce the number of truck trips entering cities.
- Licensing and regulation should be carried out concurrently with the implementation of urban freight centers and consolidation schemes.
- Low-emission vehicles and alternative fuels for freight vehicles.
- Technology based service improvement and driver training for better logistics management can reduce costs and energy consumption.

Refer here for the Presentation: http://cistup.iisc.ernet.in/presentations/logistics.pdf

## Urban Transport-Mobility Strategies

**Date: 26th November 2013,**
**Venue: Vikas Soudha, Bangalore**

### About the SIUD:

The State Institute for Urban Development (SIUD), Mysore is an urban sector apex State Training Institute, established by the Department of Urban Development, Government of Karnataka in the year 1999

The institute is situated in the Administrative Training Institute (ATI), Mysore. The Institute became an Autonomous Institute in August 2001. The SIUD has a Governing Body and a Governing Council (Executive Committee)

### About the workshop:

This is a workshop on urban transport with specific focus on "Mobility Strategies for Bangalore" was conducted by State Institute for Urban Development Mysore (GOK).

Prof. T. G. Sitharam, Chairman, CiSTUP had inaugurated the workshop and delivered a key note address on the importance of Fast Forward Public Transportation System in order to address the Bangalore Traffic Problems.

## CiSTUP participation in External Activities

Mr. J. Satya Sai Kumar, Senior Planner and Team Leader CiSTUP had made a presentation on "ToD: Mobility Based Planning for Bangalore City". In his presentation emphasized the need for mobility planning focus should be for people mobility than vehicle mobility. In addition, suggested various mobility strategy inputs for the proposed Bangalore City Master Plan 2035.

### Sugama Pedestrian Campaign

**Date:27th November 2013 Venue :**

**SUGAMA SAFEWALK** campaign being formally launched by Shri. Raghavendra Auradkar, Commissioner of Police, Bangalore City, along with Additional Commissioner of Police (Traffic), Shri. B. Dayananda, Dr. G. Gururaj, Professor and Head of Department (Emidemiology) NIMHANS, **Shri. Lokesh Hebbani, Indian Institute of Science** and Shri. Rangaraju, BBMP Chief Engineer .

At the invitation of the Bangalore City Traffic Police, Mr. Lokesh Hebbani, Transportation Program Manager participated as a Chief Guest and Traffic Expert in the Sugama Pedestrian Campaign called as 'Sugama Safewalk' campaign for pedestrian safety at seven locations started on 27th November, 2013.



The drive has been taken up on priority basis as studies and statistics have revealed that pedestrians are most vulnerable to accidents among road users.

As part of the pilot project, Trinity Circle, Siddapura Junction up to 10th Cross, Madiwala Police Station Junction up to Ayyappa Temple Junction, Lalbagh West Gate Junction, Havanoor Junction, Yeshwantpur Junction and Esteem Mall Junction are set to become pedestrian-friendly. On completion of the three-month pilot phase, the interventions will be improved on the basis of results. The improvements will later be implemented at every junction or road which poses a threat to pedestrians' safety due to narrow, damaged or non-existing footpaths, encroachments and one-ways.

One location in each traffic zone has been selected for the pilot phase. Each location will have a panel to implement the project with the Zonal Assistant Commissioner of Police chairing it with a member for technical support from the BBMP. The designs to bring about improvements in pedestrians' comfort and safety at each location will be finalized by a core panel comprising the Commissioner of Police, Additional Commissioner for Traffic, BBMP Commissioner, a consulting architect and a **traffic expert (Mr. Lokesh Hebbani, Transportation Program Manager, CiSTUP, Indian Institute of Science).** An adviser from the National Institute of Mental Health and Neuro Sciences (NIMHANS) will also guide the panel. The panel will also have a traffic expert, a citizens' representative and any NGO or voluntary organization interested in pedestrian safety.

## CiSTUP participation in External Activities

# 3rd Environmental youth conference - Greening with Goethe 2013,

**Date: 29th November to 1st December 2013,**

**Venue: Bermen, Germany**

Greening with Goethe is an environmental project, which is based on the guidelines of Education for Sustainable Development by the United Nations. The Greening with Goethe Conference 2012 has been awarded as an official project of the UN Decade "Education for Sustainable Development (2005 - 2014)".

School-students from different countries investigate environmental issues in their neighbourhood. They identify an area in their city for which they would like to take over the sustainable sponsorship and on which they would like to conduct their research. An international group of environmental scientists will guide the students through the process.

Environmental problems are probably the biggest hazards to life and health. The tempo of economic growth is unfortunately directly related to the rapid degradation of the environment and increase in all types of pollution.

Germany is known for its leading role in environment protection. It is the powerful engine that drives the development of demanding environmental and social standards. The educational institutions of Germany have made significant progress, especially in the use of science and research to innovate for an environmentally sound development.

The Goethe-Institute is widely known for its excellent cooperation with schools. Children and teenagers are interested in environmental protection when they can learn about it by trying out the research themselves: They must experience and comprehend that this topic influences their present and future. This is the starting point of the project Greening with Goethe.

## CiSTUP participation in External Activities

The 3rd Environmental Yourth Conference –Greening with Goethe 2013 was held in BERMEN,GERMANY from 29th November till 1st December 2013, Students from India , forty students, and thirty students from Germany participated in this Environmental Youth Conference in Bremen, Germany.

They listened to the talks by selected Indian students and German students on the various projects that were carried out in the past one year. Scientific impetus was provided to these research works: The conference ended with signing up of Bermen Declaration.

See for details :
Website: http://cistup.iisc.ernet.in/index.php

The students got the opportunity to discuss the most urgent questions on climate change and to formulate a catalogue of sustainable measurements for their research areas. Over three days, students, teachers and scientists worked closely together, discussing environmental problems, exchanging ideas and developing fresh action plans. At the invitation of the Goethe Institute CiSTUP, IISc was representedby **Prof. T.G.Sitharam, Dr. Chanakya Hoysala, Mr. LokeshHebbani, Mrs. Jaya Dhindaw & Dr. Gururaj p**articipated in this conference. The Conference was held at University of Bremen, Bremen, Germany.

## Suburban rail Service workshop for elected Representatives "Namma Railu"

**Date: 10th December 2013**

**Venue: Vidhana Soudha, Bangalore**

### About Namma Railu:

Accessibility and mobility-the most important pre requisites for any kind of area development to occur, would be exponentially improved by the Bengaluru SubUrban Rail Service. This is affordable mobility option provided by Namma Railu will create reliable and fast accessibility to centres of education, health care, recreation, industries and businesses leading to empowerment of the people.

The possibility of an alternative communicating option for those in the SubUrban to come to the city, as well as for those in the city to travel to the Suburbs would create positive economic externalities for both the core and the periphery. Namma Railu would be integrated with the existing public transport services such as the bus network and metro network to create a 'multi-modal mass transit system' for Bengaluru and

## CiSTUP participation in External Activities

its surrounding towns. Not only would this relieve some of the pressure under which Bengaluru's road are cracking, it would also trigger widespread growth and development in the suburbs and neighbouring areas.

### About the workshop:

The workshop was organized only for elected representatives to apprise them about the importance of the project and make them prevail over union minister Malikarjuna. M. Kharge to approve the project.

Under the phase 1, the project would cover Bangalore-Mandya, Bangalore-Bangarpet and Bangalore- Tumkur sectors network spread over a distance of 200km.

Karnataka government has not only asked the Railways to approve the project, but also it wants to pick up equity in Bangalore SubUrban Railway Company Ltd, a special purpose Vehicle to be launched to implement the project and contribute 50% of the project cost estimated to be Rs. 8,759 crore.

The members of the workshop were as follows:

1. Vinay Kumar Sorke, Minister for Urban Development
2. Haris, MLA
3. Dr. Rafeeq Ahmed,
4. Veeranna Mathikatti,
5. Venkatesh, Ex MLC
6. Shivakumar, FKCCI Chairmen ,
7. Anil Kumar Agarwal, DRM
8. Dr. Anup, ADOM
9. Prof. T. G. Sitharam, Chairman, CiSTUP
10. Manjula, DULT Commissioner
11. Vinay Rao expert on Environmental Issues,
12. Dy Speaker, Prakash Mandoth
13. ZRUCC Member,
14. From Praja : Murali, Sathya, Srinidhi, Sathindra Pal Chopra,
15. Print Media people.

Minister Sorke gave an excellent speech on the Suburban Rail. Followed by presentation in Kannada from Praja and Prof Rajeev spoke on and gave Socio Economic benefits. Prof. T. G. Sitharam gave the presentation on Stake Holders followed by Manjula from DULT explaining the status of the project. SWR DRM offered to extend their co-operation in implementation of the project. Also DRM made statement saying Bangalore - Ramanagar MEMU service is planned and any time expected to be rolled out.

Further MLA Haris, Dr Rafeeq Ahmed spoke and expressed their support to take up with Railway Minister..."

## Mobility for all in Indian Cities

**- T. G. SITHARAM,** Chairman, CiSTUP

Roti Kapda Aur Makaan (Food, clothing, and shelter) phrase refers to the bare necessities of life, which was popularized in the late 1960s. But today, people also need clean drinking water, health care facilities, schools, roads, electric supply and above all people friendly governance. Millions of poor people dream differently for different things. Apparently there are countless dreams. These dreams are more like a vision for one's country aspirations for future and hopes and constitute a virtual wish. The following phrase sums it all that MOBILITY of the human being is the key for progress.

"If you can't fly Run!
If you can't run, Walk !....
If you can't walk crawl…

But keep moving towards your goal. That's true life."

In India and in particular Indian cities, we need to give stress to "Moving people and goods " instead of moving vehicles. This way we can cut costs, reduce the cost of commodities and also fulfill the aspirations of the people to get on with their everyday life.

1. Pricing of public transport should be reduced for all (for poor – for providing mobility and for others - attract them towards public transport from their personalized modes like cars and motorbikes). Scientific study should be done to fix the price for public transport and public transport motto should be about not making profits. To attract the two wheeler riders into public transport, it is necessary to price the public transport fares per km should be lesser than the cost of operation for two wheeler riders per km. More reliable, safer and clean public transportation with AC comfort needs to be provided along with cheaper fare system to make the public transport a successful.

2. Govt should not subsidize the Fossile fuels like price of petrol and diesel. Fossil fuels should be supplied in a different way for public transport companies and fuels for vehicles which are being used for movement of people (Buses, trains, autorickshaws, etc.) and goods.

3. Provide public transport in all our tier I, Tier II and Tier III cities to move people. We need to attract people from two wheelers & personalized vehicles into public and para-transit modes to achieve sustainable transport in our cities.

4. Increase the modal share of public transport (from 40~50 % to 70~80% in our cities) by integrating different modes (metro, buses, para-transit like auto rickshaws, suburban surface trains, long distance trains, light rail and mono rail and efficient public transport systems

5. Improve last mile connectivity by improving pedestrian facilities like footpaths, road furniture's and non motorized transport (by ddeveloping rent a bicycle systems, bicycle stands, etc) and para-transit modes (like shared autos, shared taxis, autos/taxis, etc.).

6. Use of ICT for delivering intelligent transport systems to the common man and all sections of the society.

Mobility for all also brings "safety on our roads" and it improves "security to our women and children". There is an urgent need for a policy frame work for PT bus / train system, developing new bus technologies, introduction of light rail transit systems sharing the existing railway infrastructure, enhancement of quality of service with excellence, right transport infrastructure for operations and maintenance, alternative fuel options and comprehensive IT technologies for PT solutions.

## A Methodology to Measure Indicators of Urban Sustainable Development in India: Case Study Bangalore

**- Keya Chakraborty**
Planner, CiSTUP

### Motivation of the research:

Sustainable development is one that satisfies three basic conditions i) rates of use of renewable resources do not exceed their rates of regeneration, ii) rates of use of non-renewable resources do not exceed the rate at which sustainable renewable substitutes are developed, and iii) rates of pollution do not exceed

the assimilative capacity of the environment. Urban sustainability takes all aspect of human society as environmental, material, ecological, social, legal, cultural, political, and physiological dimension. Urban life requires good environmental quality, adequate water and food supplies, housing infrastructure as well as green and open spaces. On this ground UNCHS and World Bank have derived a number of indicators like socio-economic development, infrastructure, transport, environmental management, local government, affordable and adequate housing and housing provision as a measure of urban sustainability. Therefore, sustainability assessment can be simply defined as any process that directs decision-making towards sustainability.

## Gap areas:

Based on a thorough literature review two gap areas are identified as main concern of the present research:

1. Lack of substantial research work on the topic of sustainability of Bangalore as a case study and
2. Though macro level sustainability assessment is available but there is a need to explore micro or local level assessment of the existing concept.

## Objectives:

Based on the same the objectives are –

1. To identify public service indicators of sustainability
2. What is the extent of inequality of public service indicators within a society – world scenario versus Indian City comparisons.
3. A critical review on different methodologies on selecting indicators of sustainability index
4. How come those indicators at local level within an Indian city are varied from national level and other developed city's local level

## Research framework:

Figure 1 depicts the framework of the proposed research. It deals with four steps starting with pre-survey phase, survey, analyses, and conclusions. Each step deals with detailed phases in accordance.

Based on the aforesaid three objectives the research will focus on deduction of the indicators from macro level to micro level, viz. world level scenario to Indian level and finally at local level. Malleswaram area of Bangalore city has been taken as a micro level survey for the present research.

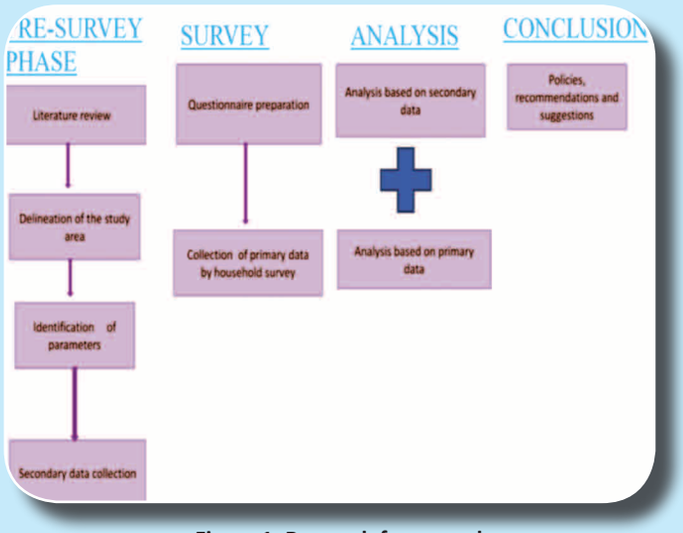



**Figure 1: Research framework**

# EXPLORING FORM-BASED CODES: A PILOT STUDY IN BANGALORE

Principal Investigators:

**Jaya Dhindaw, Radha Chanchani, J. Satya Sai Kumar, Prof. T. G. Sitharam,**

**CiSTUP**

The current land use zoning and building development controls defined in the Master Plan are too broad-brush and often not in sync with local contexts and ground realities. They typically use parameters like building setbacks, heights and FAR to regulate built form. However, these prescriptions are easily and regularly flouted.

Therefore, it is valuable to look at other ordinances, standards and best practices to determine if there is one that involves the community it affects, promotes predictability in outcome, meets the development and growth needs of the city, and is transparent in its formulation and implementation.

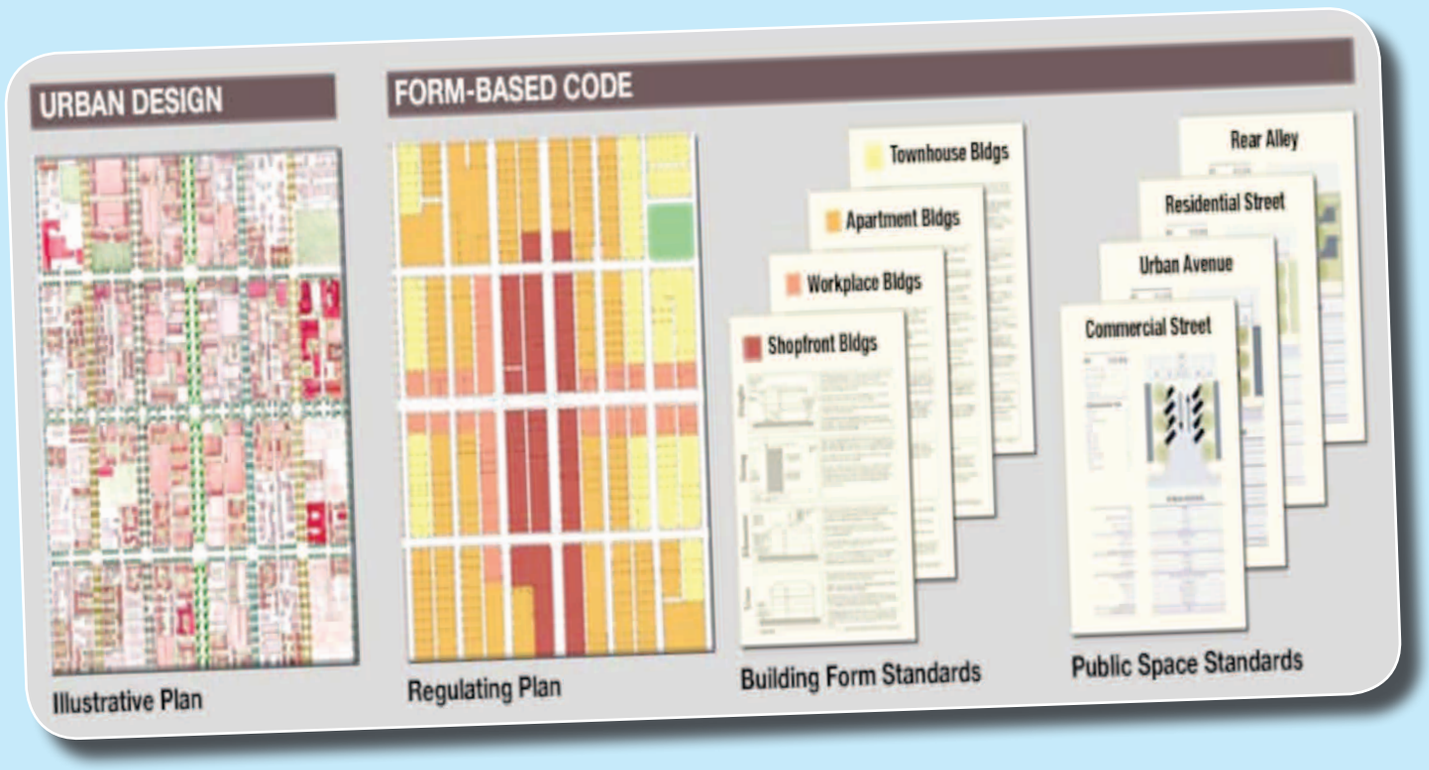
In this context, recent international studies indicate that 'form-based codes' have the potential to offer a powerful alternative to conventional zoning.

Form-based Code is a regulatory tool that fosters predictable built results and a high-quality public realm

by using physical form (rather than separation of uses) as the organizing principle for the code.

In this connection, the Department of Urban Land Transport (DULT) requested CiSTUP, IISc to conduct a pilot study to explore the feasibility of implementing Form-based Codes (FBC) and demonstrating its pros/ cons over conventional practices.

The methodology for this study involves literature review, site study and analysis, code development and preparation of final report. An important component of this exercise was local community interaction and participation. As such, apart from community surveys and interviews, a 'Citizens Workshop' was jointly organised by CiSTUP and DULT on 13th December 2013. The agenda was to inform the public in the area about the study and share findings of the site study and analysis, to administer a few surveys and interact in order to understand their major concerns and aspirations for the neighbourhood in the future.




## INTELLIGENT/SOLAR ROADWAYS

Collated by **Mr. Koti Reddy Allu**

The western world and the European nations are in the stage of proving that Intelligent Transport Systems can provide an amicable solution for the present Traffic problems. These are majorly focused upon the Traffic Management Systems. What about making the basic road infrastructure itself an intelligent one?

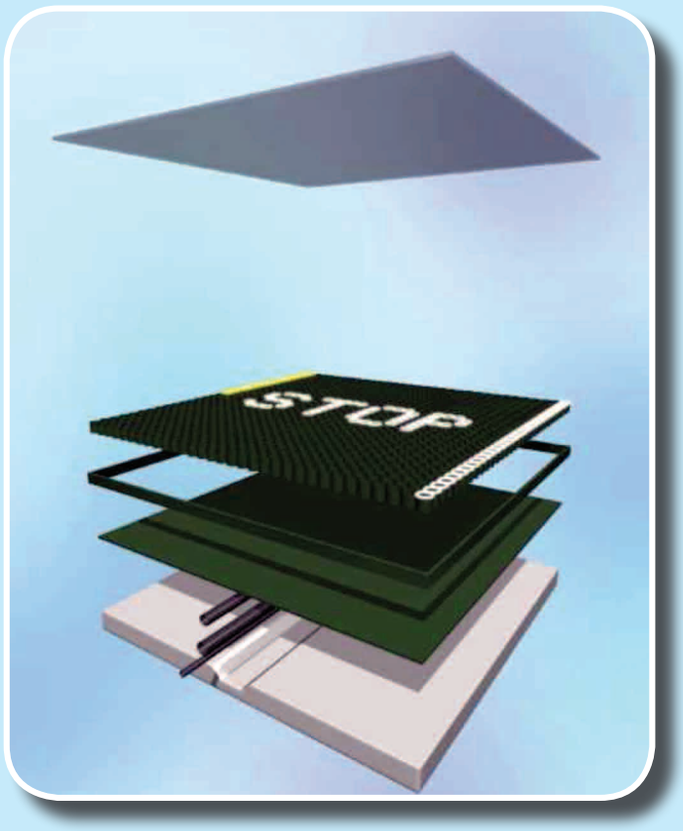
Have you ever wondered how the conventional Asphalt roads without which the road transport systems would have not evolved to be this successful, are contributing to the environmental degradation in terms of Global Warming and Heat Island Effects?

Have you ever thought of getting independence from fossil fuel usage for power generation and smart road ways which will also help in consistent economic growth of developing countries like India? Scott and Julie Brusaw of Sandpoint, Idaho, U.S. developed a prototype of a Solar Road section which the world might even not thought of.

**Source: 'Electric Avenue: Solar Road Panels Offer Asphalt Alternative', A news article from SPIEGEL on 24.05.2013**

The Intelligent Solar Roadway is built by connecting a series of solar road panels of size 12'x12'. Each individual panel consists of three layers.

Planners Articles




Source: www.solarroadways.com

### Road Surface Layer:

A high strength, translucent glass layer embedded with solar collector cells, LEDs and a heating element having great traction. The said layer can handle today's heaviest loads under worst of the conditions.

### Electronics Layer:

This contains a micro-processor board which can control lighting, communications and monitoring, heating element and also can sense loads.

### Base Plate Layer:

This distributes the power collected by electronics layer, data signals (phone, TV, Internet, etc.) to all homes, businesses connected to the Solar Roadway down line. Both Road Surface layer and Base Plate Layer are weather proof to prevent any damages to the electronics layer.

The solar road panels can replace current drive ways, parking lots, walking paths, bike paths, patios, amusement parks and also highways ultimately to form an intelligent, self-healing and decentralized power grid.

The parking lots developed with the solar road panels can be used as recharge points for electric vehicles and increase their range of use. This will reduce our dependency on internal combustion engine which use fossil fuels. Also the LEDs inserted can be used to give dynamic information and road signs to the drivers to help in making more rational on-route travel decisions.

A prototype of solar road panel was developed in the year 2010 with the funding from FHWA and with its phase I success, FHWA gave its nod to develop a prototype Solar Parking Lot as phase II. Even though the Brusaws argue that most of the elements can be re-used, handling the amount of e-waste generated should be looked at in a more conscious way and comprehensive manner as there are no established methods for the same.

## Mentorship in Implementing CMP Action Plans of Tier II Cities in Karnataka: Tumkur City Pilot Study

by Satya Saikumar, Jyoti Chava, Pooja Rao, N. Ramesh Babu, Harish .M

Comprehensive Mobility Plan is a document which analyses the present conditions of the city's transport network and presents the vision for the future mobility patterns along with certain strategy and policy measures to achieve the vision (As per ABD and MoUD Toolkit). Various Indian cities had their CMPs prepared in the recent years with help from the government and the consultancies. However it is usually seen that a lot of the prepared plans r emain on paper and lack implementation owing to issues of lack of funding, lack of interest, lack of technical capability, etc. Considering this, it was decided by DULT to implement the CMP Action Plans on a pilot basis in one of the cities with the CMP prepared i.e. Tumkur, as an illustration of how the implementation of CMP can bring about a positive change in the traffic conditions of the city.

The CMP for Tumkur which is a Tier II city, north-west of Bangalore in Karnataka had been recently prepared by DULT with consultancy from UMTC Ltd. CiSTUP was approached to provide mentorship for this implementation work. In this regard, pilot corridors were selected in Tumkur city and the CMP Action Plans were appraised with objective of implementation in mind. It was found that a lot of the recommendations were given on a broader-scale and thus detailed study needs to be done for the pilot corridors.

The main observations from the study were:

i. The Right of Ways(RoWs) of the roads are not completely utilized or are encroached (Up to 11m encroachment in JC Road)

ii. Encroachments are in the form of buildings (near Mandipet circle on JC Road, Religious buildings on BH Road), vendors (near Market on JC Road), parking (near Hospital on JC Road), shop extensions (On BH Road), etc.

iii. The Level of Service on all the roads is good

iv. The spatial coverage analysis of intra city bus network shows that, only 57% of bus users are within 500m radius of bus routesand temporal coverage shows that, only 4 routes are running with less than 20minute frequency

v. Footpath facility is provided only on Ashoka road and is uneven, discontinuous and encroached on most of the stretches

vi. Pedestrian crossing facility is available only at 2 intersections out of 13 or more

vii. On-street short-duration parking is found all over study area creating obstruction in both pedestrian and vehicular movement. Off-street long-duration parking is available at nominal charges in three locations with limited capacity of 300 to 400 two wheelers

viii. Vendors and hawkers are located on most stretches, encroaching both road and footpath and no planned zone is allocated to them in the area

ix. Other than BH Road which is a part of National Highway, no road has road marking or road signage

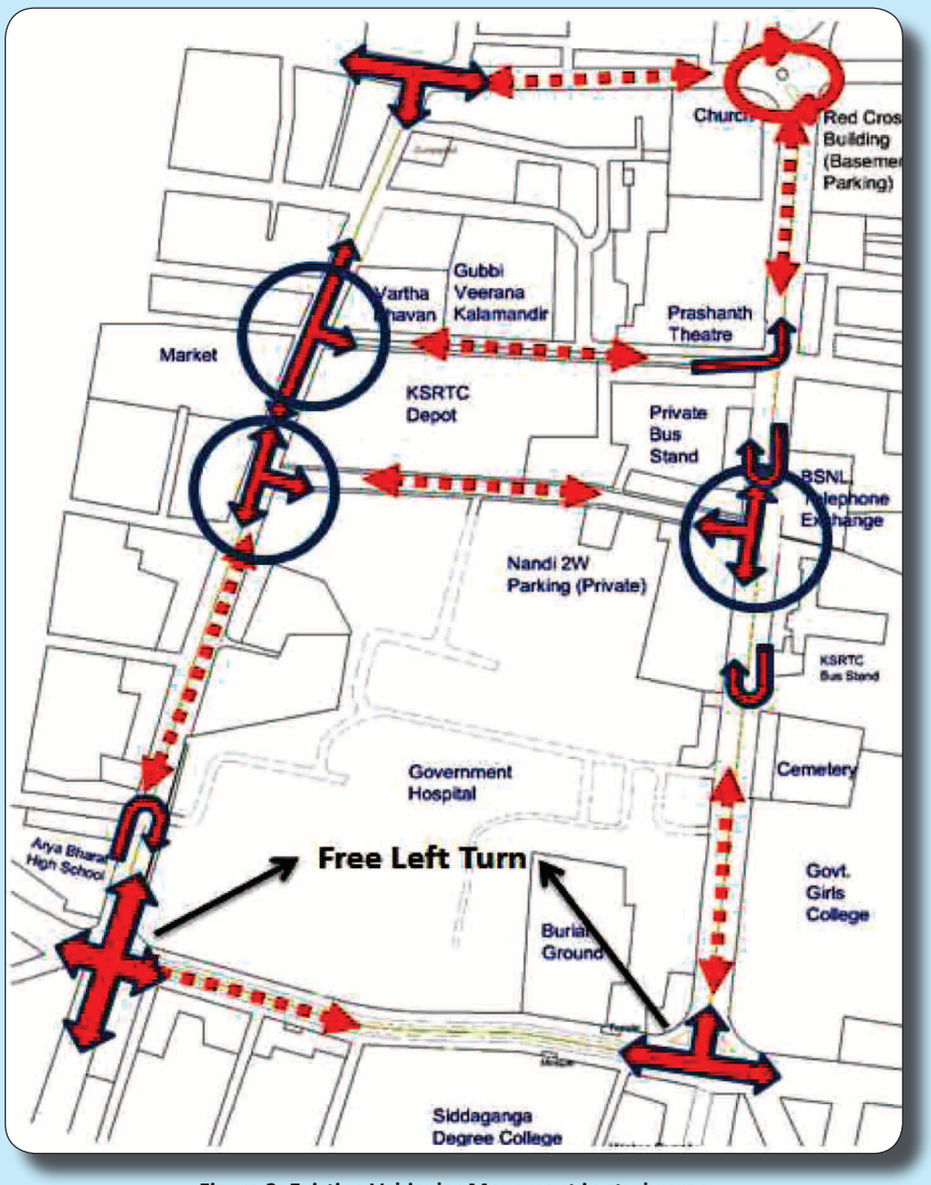



**Figure 2: Existing Vehicular Movement in study area**

## Planners Articles

With these identified issues and gaps, conceptual plans have been prepared in the pilot corridor to provide a well integrated and sustainable transport system.

Major recommendations are:

i. The vehicular movement on connecting roads is made one-way forming a loop and thereby ensuring to minimize conflicts between various modes.

ii. Pedestrian and cycle facilities are provided on all roads, the widths of which are recommended considering the RoW available and site requirements. Safe crossing are provided for both pedestrians and cyclists.

iii. On-street parking is restricted on a single side of selected roads, considering the demand and space availability

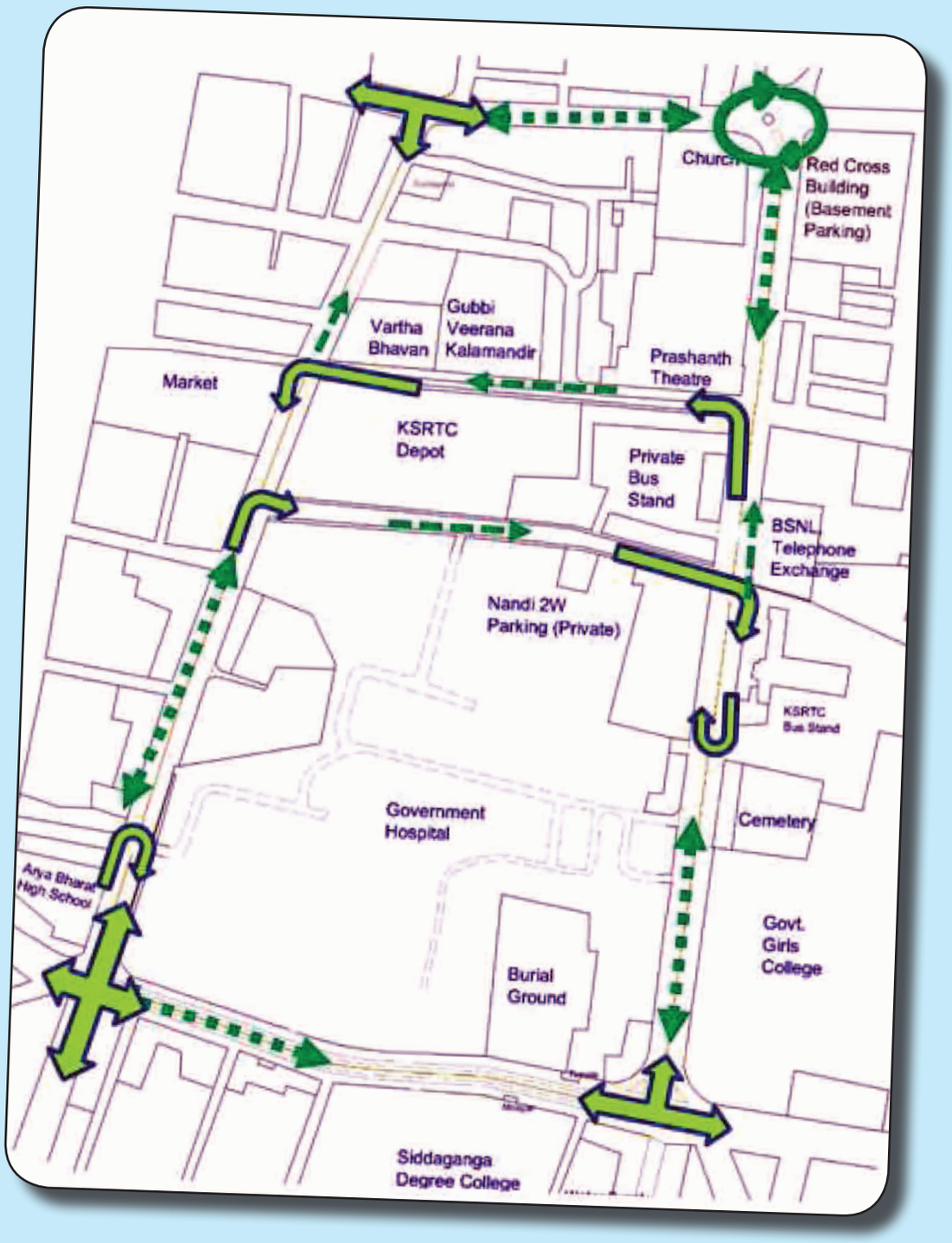



**Figure 3: Proposed Vehicular Movement in study area**

iv. Similarly vendor-zones are created with alternative plantation and adjacent footpath facilities

v. Auto stands are planned at demand-based locations with access to board from footpaths

Detailed road plans and cross-sections incorporating all the recommendations, along with estimated cost for the implementation have been prepared for all the roads in the pilot study area.

Stakeholder consultation and approval followed by the topographic survey of the area and the mentored preparation of the detailed drawing of these roads would be the final step in bringing the vision of the CMP into a reality.

## A Study of Pedestrian Underpasses in Bangalore City

**By Harish M, N. Ramesh Babu and Prof. T. G. Sitharam**

Pedestrians are one of the most Vulnerable Road Users (VRUs) because of their high accident rate. In the year 2009, there were 4.9 lakh road accidents, which resulted in the deaths of 1,25,660 people and injured more than 5 lakhs persons in India, out of which 15,983 were pedestrian deaths (India_2010 Status Paper). In the year 2012 out of 755 accident victims in Bangalore City, 354 were pedestrians which show that nearly 50 percent of accidents involve pedestrians (Bangalore Traffic Police). Some of the common characteristics of pedestrian collisions are driver inattention, struck by vehicle while crossing at an intersection, struck by vehicle while crossing midblock, struck from behind while walking along the roadway in the same direction as traffic (particularly in rural areas), motorists exceeding safe speed limits, darting out into the street at midblock and vehicle backing up (Pedestrian Facilities Guidebook). Pedestrian facilities like well paved footpaths, zebra crossing, pelican signals, pedestrian underpasses and overpasses etc., will help in a long way in reducing the pedestrian fatalities. In Bangalore City many pedestrian overpasses have been built by BBMP and BDA and many of these underpasses are not being used because of varied reasons. In this study an effort has been made to study why pedestrians do not use the pedestrian underpasses and what could be done so that more number of pedestrians uses the underpasses instead of crossing the street. A technical survey has also been done to study whether the pedestrian underpasses are constructed as per IRC standards.

## Pedalling for urban sustainability: the case of Namma Cycle as a Community Bicycle Sharing System

**By**

**Murali H. R.,** (Namma Cycle, Bangalore),

**H. S. Sudhira,** (Gubbi Labs, Bangalore),

**Gururaja .K .V,** (CiSTUP, IISc, Bangalore)

**Prof. T. G. Sitharam,** (Civil Enggineering, IISc)

Indian cities are evolving with an increase in size and numbers. Yet, as cities have been the prime driver for economic opportunities and considered as engines of growth, they pose grave challenges in terms of environment, resource consumption and hence their sustainability. The challenge of achieving urban sustainability in different spheres has become more pertinent with raising awareness on environment and global climate change.

Among one such challenge is that of urban mobility with a very high growth rate of number of automobiles than that of population growth in last decade. This has resulted in additional challenges ranging from emissions, congestion, on-street parking, and safety. In response to this, a community based non-motorized mode of transport using bicycles is considered as a viable alternative, especially for short-trips in cities. To this end, *Namma Cycle* has been evolved and piloted at the Indian Institute of Science campus. After a year of operations, this initiative is now all set for scaling and replication elsewhere. In a year, there are more than 12,000 trips made and about 60% of them have been completed within the first 30 minutes. The paper describes the process of this campus based bicycle sharing system. During the course of operations, there have been technology based measures to enhance the end-user experience of renting the bicycle and this has improved the system's efficiency. Finally, it identifies the key challenges in ensuring the 'sustainability' of such programs itself, that depends on dealing with 'people' apart from 'technology' and 'financial viability'.

## Honours and Awards:

1. CiSTUP and Gubbi Labs have jointly made an android application "FROG FIND" which is India's first ever mobile application which identifies frogs and toads in India and it has been awarded **INDIA GEOSPATIAL EXCELLENCE AWARD 2014.**

2. The world Bank and Government of Karnataka has appointed Lokesh Hebbani as the expert advisor to Government of Karnataka in the area of traffic, ITS, Road Safety, Transportation, Infrastructure and Urban Planning & Development.

3. Lokesh Hebbani has also been appointed as advisor/consultant to develop Road Safety Action Plan for the state of Bihar.


## LIST of EVENTS SINCE LAST NEWSLETTER

| Sl. No. | Event | Date |
|---|---|---|
| 1. | A talk on Sustainability and rail transit | 8th October 2013 |
| 2. | A Science Communication Workshop | 14th November 2013 |
| 3 | A Science Media Centre Consultation Meeting | 15th November 2013 |
| 4 | Orientation programme for Students from Bagalkot | 10th December 2013 |
| 5 | CiSTUP Foundation day Event | 10th January 2014 |

**Contact Us:**

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**Collated & Organized by: Mr. S. Rajagopalan**

**Designed by: Ms. Neetha .V Ashtakar**