Government of Karnataka

Expenditure Reforms Commission

THIRD REPORT

May 2011

(For Official Use Only)

Chairman:
Shri B.K. Bhattacharya, Retired Chief Secretary, Government of Karnataka.
Members:
Shri Mohandas Pai, Director (Human Resources), Infosys, Bangalore.
Shri G. Ramesh, Associate Professor, Centre for Public Policy, IIM Bangalore.
Principal Secretary to Government, Finance Department.
Principal Secretary to Government, Planning, Program Monitoring and Statistics Department.

Expenditure Reforms Commission

No. ERC/BLR-REPT/3/2010-11 24th May 2011

Dear Shri. Nagarajan,

I have the pleasure to send you herewith the Third Report of the Expenditure Reforms Commission set up by the Government of Karnataka in June 2009. Two earlier Reports of the Commission have been submitted to Government on the 11th of February 2010 and the 17th of February 2011 respectively.

This Report deals with the functioning of three Departments viz. Public Works, Water Resources and Urban Development. These are infrastructure oriented Departments ideally suited to adopt a Project Management mode for implementation of their schemes. The Commission has therefore commenced this Report with an introductory Chapter on Project Management, followed by three Chapters analysing the functioning of the above three Departments. A Summary of recommendations is also included, giving the gist of the findings and recommendations recorded in the main body of the Report.

The Commission engaged the services of iDeCK to study the organisational structure and efficacy of the schemes implemented by the Departments of Public Works and Water Resources, and by some selected Organisations under the Urban Development Department. For this purpose, iDeCK was assisted by the Karnataka Institute of Public Auditors, and by two domain experts Captain Raja Rao and Shri Jaiprasad, both Retired Engineers in-Chief of the Karnataka Government.

The Commission also engaged the Public Affairs Centre, Bangalore to study the implementation of some of the Urban Development Programmes.

This third report of the ERC has drawn substantial material from the studies made by these Agencies. Copies of the Study Reports submitted by iDeCK and PAC will be forwarded to you separately.

I take this opportunity to place on record the contribution made by Shri B.G. Jayaram, Associate Vice President & Head of the Project Management Centre of Excellence, Infosys Technologies Limited, in assisting the Commission to appreciate Project Management experiences of the Private Sector.

I also thank the Principal Secretaries / Secretaries to Government of the Departments of Public Works, Water Resources, Minor Irrigation and Urban Development, the Heads of Departments and Chief Executives of the PSUs in these Sectors, and the officers working under them for their co-operation with the Commission and the Consultants engaged by the Commission, and for

their valuable suggestions offered at different stages of the preparation of the Study Reports and the ERC Report. I appreciate the efforts of the Municipal Reforms Cell (MRC) who had organised a presentation on Karnataka Municipal Reforms at a short notice of just two days.

The two young Consultants working in the ERC, viz. Ms. Prathiksha Shetty and Shri Mandar Nayak have worked very sincerely in providing input for preparation of this report, which has been finalised with the most valuable contribution from Shri P.R. Devi Prasad, Director FPI and Shri R.S Phonde, Deputy Secretary, F.D who is also I/c Secretary ERC. As mentioned in my earlier letter, while forwarding the 2nd Report, the Commission is particularly thankful to Shri P.R. Devi Prasad and Shri R.S Phonde who have attended to work related with the preparation of this Report in addition to their own other onerous duties as full-time officers of the Government of Karnataka. Shri Srinivas Kumar Alamuru, Advisor FPI has also provided useful suggestions for improving the analytical quality of the report.

I thank Smt. Sasikala E.K, Smt.S.G. Lokamba and other staff of the Commission for their contribution in different ways towards the smooth functioning of the Commission.

Finally, I would like to thank you and other fellow members of the Commission, Shri Sanjiv Kumar, Principal Secretary, Planning, Program Monitoring and Statistics Department, Shri Mohandas Pai Director (Human Resources) Infosys Ltd, and Shri G. Ramesh Professor, IIM, Bangalore for your participation in the deliberations of the Commission, and for your observations and suggestions which have been of substantial value while finalising the Report.

With regards,

Yours Sincerely,

B.K Bhattacharya
Chairman

Shri L.V. Nagarajan,
Principal Secretary to Government,
Finance Department, Vidhana Soudha,
Bangalore.

Copy to:

1. Shri Sanjiv Kumar Principal Secretary to Government, Planning, Programme Monitoring and Statistics Department, M.S Building, Bangalore.
2. Shri Mohandas Pai, Director (Human Resources) Infosys Ltd.
3. Shri G. Ramesh, Professor, IIM, Bangalore.
4. Shri Ajay Seth, Secretary to Government (B & R), Finance Department.
5. Shri P.R. Devi Prasad, Director, FPI, MSIL House, Bangalore.
6. Shri R.S. Phonde, I/c Secretary, ERC.

Contents

Summary of Recommendations

Project Management

1. Government should internalise lessons learned from successful projects, and put in place a formal and fairly standardised set of procedures that would enhance project implementation capacity in the Departments on a continuing basis. (para 1.1)

2. The need for preparation and planning is critical at each stage of the project. Ideally, the project management activities for the project should be initiated at pre-execution stage. For the purpose, the Project Management Unit (PMU) should be identified early and activities such as need assessment studies, determining the basis for design conditions and calculations for financial viability, etc., should be taken up in co-ordination with the project management unit. (para 1.6)

3. The DPRs should include a risk management plan to identify and monitor the risks associated with the project viz. likely factors which may cause time over runs, cost over runs and factors relating to stake holders in the project including the maintenance challenges. The role responsibilities (responsibilities for giving clearances) and interdependencies of the stakeholders could be made a part of the Detailed Project Report for each project. The risks and dependencies identified in the Detailed Project Reports could then be incorporated into the project plan.
(para 1.7)

4. The Detailed Project Reports should include a time schedule of deliverables or activities using work break down structure. In a work break down structure, project works are classified into activities with defined cost and time parameters. (para 1.8)

5. It should be made mandatory for completion reports to be filed for each project, once the Project is completed. The completion report could provide an understanding of the project with respect to objectives achieved and various factors encountered and addressed during the project period for achievement of the project objectives. The Completion Report should contain a statement showing the project objectives achieved vis-à-vis the baseline data and outcome indicators as given in the Feasibility Report and Detailed Project Report. The completion report should also include time schedules both for maintenance of the project and for taking up an evaluation study of the project within three years at the latest of completion of the project. (para 1.9)

6. There is a need, at the pre-execution stage itself, to define the roles and responsibilities of each one of the multiple agencies involved in the project. Such defining of roles and responsibilities is important particularly for projects executed in the PPP mode, as any delay in PPP projects would increase contingent liability on government. Similarly, at the outset itself, a Memorandum of Understanding (MoU) should be entered into by the different agencies involved in the project. Bottlenecks could also be mitigated by establishing a third party project management unit to co-ordinate between departments, flag delays, and monitor progress under the various project parameters. (para 1.14)

7. Infrastructure Departments should actively seek support and co-ordination from the e-Governance Department to set up the infrastructure for an IT based project management. (para 1.15)

8. It is essential that the projects are strengthened with institutional capacities for project development and project management. Going forward, it is equally essential that the institutional capacity is mainstreamed/internalised into the existing departmental structures in order to build up in-house expertise. For this purpose, regular training and capacity building should be built into the departments' organisation structure. (para 1.16)

9. In the case of high value projects exceeding ₹ 5 crores, particularly those relating to infrastructure, a project management approach should be adopted similar to the one followed by the Public Works Department for projects in KRDCL and KSHIP. This project management approach should be dovetailed with existing e-governance practices such as e-tendering, e-procurement, etc. already being used by the departments. (para 1.17)

10. A database of projects executed in the past should be developed, which could be used to understand various challenges faced by the department in different districts. Similar to MIS reports followed for department reports in the State, Project Management Dashboards could be prepared which include the comparison of initial base line parameters with actual completion parameters, time schedules, etc. (para 1.18)

11. The departments should undertake skilled development of personnel associated with the project. It is also desirable that engineers from the various agencies and contractors are also involved in co-ordinated project management training programmes prior to the commencement of the project. Such co-ordinated project management training programmes could be made a part of the tender conditions. (para 1.19)

Departmental Recommendations

i. Public Works Department

12. The Commission has looked into the project selection guidelines followed for road projects aided by external agencies and recommends that the same may be adopted for road projects taken up with state funding. The report also stresses the need for regular evaluation study as a part of road projects and recommends that the department take up econometric evaluation of roads in the State as a separate study. (para 2.4)

13. The Commission recommends that the PWD should update the asset registers and get the same validated by independent agencies. Although preparation of an asset register complying with Audit standards may take time, the department should make a beginning to prepare an inventory of its assets immediately, and upgrade the same into a full-fledged comprehensive register within two years. (para 2.5)

14. While invoking the power to acquire land for road development, it should be mandatory that a technical feasibility study, justifying the alignment of the road as the best option, is available to the State Government. (para 2.18 b)

15. The PWD must ensure that road works are selected more objectively and that funding is tied up before starting work on any road. Furthermore, periodic road maintenance should be carried out more methodically, using an information system to ensure that all the roads are covered within a specified time frame. (para 2.24)

16. The Commission recommends that the PWD should emulate the methods of Project Selection and implementation adopted in externally aided projects in the State, while taking up projects financed from the State Government budget. Detailed feasibility and project report should be ensured for each of the PWD's Road development projects to address and reduce the prevailing extent of arbitrariness in scheme selection. Further, it is recommended that a review of the project outcome indicators should be carried out after completing execution of the project. (para 2.30)

17. PWD needs to take up with the assistance of institutions competent in econometric analysis, a separate study of the overall contribution of important roads to the State economy. The study could examine the economic impact of roads on, industrialisation, exports, contribution to SDP (State Domestic Product), State's tax revenue, etc. The study of economic parameters could be entrusted to institutions with ability to conduct econometric analysis of such issues. (para 2.31)

18. The Commission is of the view that a separate 'State Road Regulatory Authority' should therefore be set up to determine road tariffs for various roads in the state. Tariff fixation must be done with independence, transparency and professional competency. This regulatory authority could look into the development of roads and ploughing back of collected user charges for the

benefit of road users across the State. The regulatory body could also ensure compliance to standards on construction of roads and structures on land adjacent to the roads, road protection, safety features, other features like speed breakers, etc. (para 2.34)

19. There is need to follow uniformity in designing the public buildings. The Chief architect of the department and the panel of architects should be encouraged to provide building designs which ensure features like environment friendliness, natural air and ventilations, etc. Also the Commission was of the view that the architects should be encouraged to design the buildings for easy maintenance after the completion of the building works. (para 2.35)

20. As regards the construction of bridges by PWD, it is recommended that, taking into account the flow of water, quantity of water, land to be taken up for acquisition, the PWD could consult the Water Resources Department as to whether the bridge could be constructed as a bridge-cum-barrage as a means to create water bodies for watershed development and for utilising water for Irrigation and other purposes, etc. (para 2.36)

21. Committee for according approval to the Schedule of Rates should also include a representative of the Finance Department of the State Government and the rates, before they are firmed up, may be placed in public domain inviting suggestions and objections from the public and other user departments. Since the e-procurement platform is available, the Department should be able to collect prices quoted by vendors during atleast the last three years in respective circles, including those who did not win the bids, but quoted lower rates for some items. All such inputs should be considered for arriving at the Schedule of rates. (para 2.37)

22. Going forward, activities like training and skill development, project monitoring, contract management, could be taken up in co-ordination with e-governance Department. The Commission strongly recommends that the Government should bring out the revised PWD Code within the next three months. (para 2.39)

23. The Task force on Quality Assurance in Public Works should, inter-alia, set up norms for Technical audit of all large projects. Further the projects should be prioritized for technical audit based on the project cost. All Projects worth ₹ 10 crore and above and which have achieved physical progress of 50 percent should be compulsorily submitted to a technical audit. Further the government should compile a Quality Control Manual and Quality Assurance manual for immediate dissemination to the project personnel to facilitate training and skilled development of the project personnel in quality works. (para 2.40)

24. It is desirable to have an institutional focus on activities and to develop institutional expertise and memory within each of department handling the works for Water Resources, Urban Infrastructure, and Public Works. Therefore in line with the Karnataka Panchayat Raj Engineering Department Service cadre constituted under the RDPR, separate engineering department/cadres for (i) “Urban Engineering”,(ii) “Water Resources” and (iii) Roads, ‘Bridges and Buildings’ should be constituted. The engineers from the Public Works Department may be

allowed to exercise an irrevocable option for absorption in one of three cadres mentioned above. (para 2.41)

25. Engineers of PWD should be also provided with higher education opportunities to pursue specialized Post-Graduate courses in highway planning, traffic planning, traffic engineering, transport economics, etc. (para 2.42)

ii. Water Resources Department

26. The State Government should draw up effective project appraisal tools, focusing especially on financial and economic returns from State investment on irrigation projects. The Department could create a Project Design & Management unit equipped with Project management tools to provide support, particularly by way of containing cost & time over runs, during the construction as well as the operation phases. (para 3.8)

27. The irrigation project reports should include techno-economic investment analysis explaining the rationale for the project with supporting documentation indicating the study of possible alternative options. The Suggested Generic Reporting Template mentioned in the 2nd Report of the Commission includes factors to be considered for Economic Analysis, Option Analysis and Project Impact Analysis. The Commission recommends that the Government may make use of the templates and that the Water Resources Department in co-ordination with related Departments i.e. the Agriculture Department, Energy, and Urban Development Department, should create a template for Economic Cost:Benefit analysis of the projects. (para 3.9)

28. Incomplete projects that have reached 85% cumulative physical progress as on a predetermined date should be declared as 'substantially complete'. Based on this, the Department should compile a 'Schedule of Balance works' for budgetary allocation. Such allocation could be made under a separate scheme with a sunset clause of 2 years. The Department should form a separate Project monitoring unit within the department to monitor the financial and physical completion of Schedule of Balance works. Hence, instead of repetitively working out the revised project costs separately for each of the incomplete projects, the Schedule of Balance works should be made use of for budgetary allocations. (para 3.12)

29. Audit also reported irregularities such as allowing of undue benefit to contractors, unwarranted change in standard terms of contract, contractors being allowed to make modifications to quoted rates in violation of guidelines approved by Board of Directors of the Company, payment at rates higher than the approved Schedule of Rates, recording of false measurements on the basis of which excess payment to the extent of several crores of rupees was made to contractors, non compliance with the KPWD Code and misappropriation of funds. Such actions by officials/contractors obviously attract penal measures. The Department needs to conduct prompt and speedy enquiries into all such cases, and award exemplary punishment to officers found guilty, as a demonstrable deterrent measure. (para 3.14)

30. There is a need for the KBJNL, KNNL and the Water Resources Department to adopt professional project management approach for executing irrigation projects in the State. Similarly, the Land Consent award followed by KBJNL in the Upper Krishna Projects should be followed for mitigating risks associated with delays caused due to land acquisition. In the vexed matter of encountering increased occurrence of hard-rock during execution of project as compared to initial estimates, it is recommended that a) the contract terms may be so designed that whenever hard rock found during project execution is more than 10 percent of the initial estimates, the extent of hard rock should be measured and validated by a third party expert team; and b) while preparing estimates, latest technology of geological imagery should be utilized in order to correctly assess the hard rock. Several instances of irregularities noted by audit and poor compliance with audit observations underscore the need for better supervision and oversight. KBJNL and KNNL should strengthen the internal audit in their companies so that the scope for misuse of funds in executing irrigation projects is minimised. (para 3.15)

31. The Commission emphasizes the importance of creating a sense of ownership of irrigation assets amongst the water users in the areas of the completed projects. In case of incomplete projects or for projects in progress, a system of collecting user charges after a period of say, 2 years of release of water, by the irrigation Authorities should be made mandatory. (para 3.20)

32. Initiatives for collecting water charges for power generation have to be enlarged to cover all projects including micro/mini/small hydel power projects which have completed five years life. The Government Order granting open-ended price concessions to micro/mini/small hydel power projects needs to be amended to introduce a sunset clause. Similarly, ULBs wherever, they draw water from Government Irrigation sources should pay water charges as provided by the Karnataka Irrigation (Levy of Water rates) Rules, 2002. The ULBs can in turn, collect appropriate water charges from their users. (para 3.20A)

33. The Water Resources Department in co-ordination with the Finance Department should evolve an implementation strategy for recovery of water charges from users in accordance with the recovery rates as suggested by the 13th Finance Commission or as mandated by the Water Regulatory Authority. (para 3.22)

34. The Water Resources department should orient the CADAs to ensure community participation in irrigation management, and to extend structured training and education to the Water User Associations and farmers in their respective command areas in matters such as the efficient use of available water, practice of effective water harvesting techniques, and adoption of drip and sprinkler methods of irrigation so as to maintain increased productivity and soil fertility in the Command area. (para 3.23)

35. CADAs should monitor the relevant parameters and communicate the same every month to both the Water Resources Department and the Agriculture Departments (committed and experienced professionals should be posted in the CADAs with fixed terms of atleast 3 years

each. The CADA staff should be given regular orientation, training and technology support to enhance their competence. (para 3.23A)

36. The Karnataka Community Based Tank Management Project (KCBTMP) demonstrates the feasibility of forming Tank users groups for managing the irrigation assets, and recovering of water charges for maintenance. This model needs to be sustained in order to continuously draw benefit from Tanks without burden on budgetary resources. Further, the model can be suitably upscaled to involve water users in all other irrigation projects effectively. If necessary the officers and staff involved in KCBTMP, which is a kind of social engineering/enterprise development activity, may be deployed for up-scaling operations in the medium irrigation project areas or under CADAs (para 3.26)

37. The State Government should expedite the constitution of a State Water Regulatory Authority to function as a regulator for water use in the State. This authority has to fix and regulate the water tariff system and determine and regulate the distribution of entitlements for various categories of water users. (para 3.31)

38. The Water resources department, Nigams and CADAs should be encouraged to maintain more accurate and credible database required formulating proper water rates for water use. Systematic maintenance of asset registers, and a credible data-base relating to capital cost, O & M cost, quantum of water released in different seasons, data regarding yield of different crops, market rates, etc., can form the basis for fixing water rates and a reliable system to collect the same. The Water Resources Department should also formulate a training plan for its personnel to use the data. (para 3.32)

39. There should be good co-ordination between the various agencies involved in the project, so as to give minimum scope for changes in scope or design, or for delays in project implementation. The Water resources department should organise regular training of the staff on the necessary procedures, documentation and record-keeping required to be maintained for better project management. (para 3.33)

40. The recommendations of the Working group on Water Resources set up by Ministry of Water Resources, Government of India regarding the Strategies for improving irrigation efficiency and measures for efficient irrigation water delivery are very apt for Karnataka. These include evolving a basin efficiency concept which integrates all surface water and ground water uses as well as reuse and recirculation, conjunctive use of water, selective lining of canals, preparation of water budget, preparation of O&M budget in consultation with farmers, study of all schemes which are more than 25 years old for structural safety and performance. (para 3.34)

iii. Urban Development Department

41. There is a need to examine, in detail, the pattern and process of urbanization and its implications for present and future economic growth of the State. Long term strategies for

sustainable economic growth need to be examined and evolved. In order to step up industrial development in predominantly agrarian regions of the State, the development of new urban settlement of sizable dimension in an appropriate location in central/north eastern Karnataka needs to be promoted vis-a-vis urbanisation in Bangalore. It is critical that Karnataka augments its efforts substantially to manage the process of urbanization and the related transformation effectively, primarily by investing in urban services and developing HR capacity for urban management, including financial management and asset management. (para 4.16)

42. It is recommended that BWSSB plan a dual pipeline system and supply tertiary treated water to the 8 CMC's included under BBMP jurisdiction, as well as to new layouts formed by BDA. The possibility of using tertiary treated water in the future for water supply and irrigation purposes could also be explored. Government may also direct all ULBs, KUWS&DB to plan dual pipeline systems in all urban areas so as to supply tertiary treated sewage water, after undertaking an extensive education campaign among water users. (para 4.32)

43. The Commission recommends that the urban water supply projects should be undertaken based on a comprehensive assessment of the technical (suitability of the design), financial (sources of financing including interest rate negotiation with the lenders), environmental and quality aspects as also after taking note of alternative arrangements for drawing and storing water. (para 4.35)

44. In order for the Boards to serve the ULBs better a database of existing assets and its condition may be prepared by each ULB e.g. details of the distribution pipeline (length, type of pipes, condition status etc), public taps, overhead tanks, ground level reservoirs, etc. including the GIS mapping of the areas under the jurisdiction of the ULB. The data needs to be updated periodically. (para 4.36)

45. The Commission is of the opinion that there is a need for KUWSDB to hand hold ULBs in proper maintenance practices till they develop adequate capacity. (para 4.37)

46. The project report should have a "Maintenance Plan" which includes staff requirement for maintenance and recurring cost. There is a need for a policy by the State Government on inclusion of O & M as a part of project report and it should incorporate technical, administrative and financial aspects of both execution of the project and O & Ms. (para 4.38)

47. The Commission recommends setting up of an agency which could co-ordinate between the ULBs and Boards as well as performs certain regulatory functions. (para 4.39)

48. The methodology followed in KMRP should be documented in the form of a report so that a similar network database can be undertaken for the Boards in the State. Further the model should be upscaled to include a database of existing assets. Information regarding the condition of the assets can be regularly updated by each ULB with details of distribution pipeline (length, type of pipes, condition status, etc.,), public taps, overhead tanks, ground level reservoirs, sewerage treatment plants, owned properties for self use and properties given on long lease and

rent, properties not subject to tax, vehicles and such other assets belonging to the ULBs. Also the GIS mapping of the areas under the jurisdiction of the ULB and the data could be updated periodically. Further, the department should conduct a process audit of the project regularly through a third party to assess the potential of the software system for further improvements and increased coverage. (para 4.40 (i))

49. The e-governance model followed by the Municipal Reforms Cell could be further extended to include socio-economic data as part of its evaluation of ULB performance. The socio-economic data could be further used for better planning and implementation of the schemes and a focused targeting of beneficiaries. Further, the regular data uploaded by the ULBs could be effectively used for determining the outcome and long term impact of poverty alleviation schemes in the State. (para 4.40(ii))

50. Given that JnNURM was envisaged with a seven year project period (2005-2012), it is recommended that KUIDFC should prepare and publish a detailed and comprehensive completion and results report of the programme, indicating the various challenges faced and the steps taken to address the same. (para 4.40 (iv))

51. With rapid rise of urbanisation and an exponential increase in population of poorer sections of society moving to cities for better job employment opportunities, it is urgent that the State Government augment its resource allocation to avoid further compounding of the menace relating to public sanitation. Under the Basic Services for Urban Poor (BSUP) component of the programme, the State Government should prepare a proposal for a study and improvement of the status of public sanitation in Bangalore. The studies conducted under Integrated Housing and Slum Development Programme (IHSDP) should be extended to all ULBs of Karnataka, particularly the backward districts of Karnataka like Bidar, Gulbarga, etc. Further under the Greater Bangalore Pro-Poor Sanitation program under Karnataka Municipal Reforms Project (KMRP), the Government should take up additional support for construction of toilets at the community and individual levels in slum settlements in other ULBs. The Municipal reforms cell could be asked to prepare a database of the public toilets and public sanitation facilities in the ULBs in Karnataka, so that ULBs can have a perspective planning to address problems. (para 4.40 (v))

52. It is suggested that UDD guidelines should be made more specific as to what projects under ₹ 100 crore package program can be categorized as "large scale", so that the ULBs have specific directions as to what projects can be chosen under the program. (para 4.44 (i))

53. To avoid arbitrariness and adhocism in the choice of the projects under ₹ 100 crore package programs, it is recommended that an integrated city development plan reflecting local priorities and preferences should be formulated and subsequently the action plan should be derived from the city wide plan in the choice of the projects. (para 4.44 (ii))

54. Though the use of IT in project monitoring for projects under CMSMTDP is appreciated, it is recommended that programmes involving the use of IT should include a component of

training modules for staff and personnel development. There is a need for capacity building in the form of training and the use of Internet Technologies should be made for tendering and monitoring of the projects. BBMP Project monitoring through e-platform, and which is in the nature of social audit can be used as an example, with focus on the need to disclose the feedback received and action taken on citizen feedback. (para 4.44 (iv))

55. It is recommended that projects for solid waste management under UIDSSMT be taken up with sufficient emphasis given on the need to create and maintain public toilets in order to mitigate Public Health problems. (para 4.44 (v))

56. Under the Swarna Jayanthi Shahari Rozgar Yojana (SJSRY), it is suggested that the money from the underutilized ULB could be diverted to the performing ULBs. The offset should be adjusted if the performance improves by next instalment. DMA could follow the guidelines the Union Government uses for the diversion of the under utilized funds of States and the Union Territories and the same can be applied for the ULBs in Karnataka. In order to have better clarity of accounts it is suggested that the physical targets set take into account the release of the current year and the unutilized amount of the previous year. It is recommended that all the maximum unit costs be consistent with the revised guidelines of SJSRY. For this purpose, DMA should compare releases with expenditure for all the ULBs in the state. The performance analysis can be done simultaneously with the strengthening of ULBs reporting requirements. The exercise can also be repeated on a component- by component basis. (para 4.44 (vii))

57. In order to evaluate the SJSRY scheme for its outcome and benefits, the State Government should comprise a study of the beneficiaries and determine the number of people who have risen over the poverty line. Such study would also help to provide aid and scheme benefits to focused and targeted beneficiaries. (para 4.44 (viii)

58. Directorate of Town planning should draw up and put a Long Term Urbanisation Plan for Karnataka by making effective use of the City Development Plans of the ULBs and the data infrastructure provided by the Municipal Reforms Cell. (para 4.50)

59. It is essential that a register comprising the government assets owned and maintained by these bodies should be prepared and updated regularly. Further, as per section 4 (n) of The Karnataka Local Fund Authorities Fiscal Responsibility Act, 2003, local bodies are mandated to follow prudent financial management principles. The asset register should contain details of assets (separately in the form of land and buildings) owned, auctioned or leased by the ULBs, municipal corporations and the various boards. The details regarding collections of tax and revenue from such assets and the details regarding assets exempted from tax should be maintained in the registers. Further the list of beneficiaries of development rights awarded under Section 14B of the Town and Country Planning Act, should be included as part of the register. (para 4.51)

Chapter 1

Project Management

Introduction

1.1 The three Departments covered in this Report carry out many of their programmes through a Project approach. Two of these, viz. the PWD and the Urban Development Department have had the opportunity to avail of donor guided project management support for a number of their Projects, as a result of which it has been possible for them to establish certain better management practices for the implementation of their programmes. The Commission is of the view that ***Government should internalise lessons learned from successful projects, and put in place a formal and fairly standardised set of procedures that would enhance project implementation capacity in the Departments on a continuing basis***.

1.2 A Project management approach is extremely useful for certain types of projects, such as those that are spread out spatially, or those involving multiple activities. For instance, Projects like Canal head works or Lift Irrigation Schemes involve the execution of a number of sub-projects such as arrangements for supply of power, installation of electrical equipment, commissioning of mechanical equipment, and so on. Well planned and co-ordinated execution of these sub-projects is critical for timely completion of the project. In the case of certain Projects such as those relating to urban Drinking water supply or Highways improvement, multiple stakeholders are involved, including citizens affected during the execution of project activities. Wherever the implementation of any project calls for joint or parallel activities by multiple agencies, the adoption of a project management approach would be an effective way of achieving seamless co-ordination for efficient completion & management of projects.

1.3 The consultants appointed by the Commission to study the Departments of Water Resources, Public Works and Urban Development have noted in their Reports that, in a number of projects, the tasks of Project Planning and Design, and Project Management, including Quality Control, are outsourced. It was observed that, although regular project management meetings were conducted to review & monitor progress, many projects suffered from delay and cost escalation for reasons that were often beyond the purview of the project management consultants (e.g. factors relating to land acquisition, laying of utilities, timely release of funds, etc.) In some cases, there was a lack of clarity as to the scope of the consultants. It is important for the Departments to internalise the Project management approach, and ensure that project management tools and techniques are mainstreamed to form part of the activities of the internal project management team.

1.4 The Commission noted, at its meetings with Department officials and during District visits, that time and cost over runs were primary concerns particularly in the case of projects implemented in the Road and Water Resources Sectors of the State. Annexures 1.a and 1.b provide details of a few completed projects in the Road sector, and of some ongoing projects in the Irrigation sector in Karnataka. The time over run[1] in the case of completed projects ranges from 17 percent to 133 percent, while the ongoing projects show project cost overrun[2] ranging from 150 percent to 13000 percent [3].

1.5 Generally, Projects go through multiple stages from conceptualisation to finalisation;

a. During the pre-execution stage, the Department assesses the need for the project, the rationale for the technology choice, the source of financing and visualises the expected outcomes. Projects that satisfactorily meet conditions in terms of Cost:Benefit Analysis, Rate of Return, etc., are considered for proceeding further. At this stage, project performance indicators, design parameters and possible alternative options are identified. From among these, the optimum design is selected and the project moves to the stage of execution.

b. At the project execution stage, various agencies and vendors for the project are appointed and the project is commenced.

c. At the stage of completion, the project is commissioned and handed over for operation and maintenance, and the accounts of the Project are closed.

Project Stage	Activities
Pre – Execution Stage	• Identification of Project Development Objectives i.e. need for the project • Financial sources • Identification of measurable and monitorable outcome Indicators • Calculations for Cost Benefit Analysis, Financial viability, etc. • Identification of Design parameters/ Design conditions/Design options/ contract design
Execution Stage	• Selection of vendors • Construction • Contract management
Completion Stage	• Commissioning • Handover • Preparation of Maintenance Schedule

[1] Project time over run has been calculated as the difference between the actual project duration less scheduled project duration as a percent of scheduled project duration.

[2] Project cost overrun has been calculated as the difference between the revised project estimate and the original price estimate as a percent of original estimate.

[3] Without adjusting for inflation or expansion of the size and scope of the project during implementation stage

Though various sub activities within a project may vary, depending on the nature of the project viz. Water supply, sanitation, roads, buildings, irrigation project, etc., most projects go through the stages as mentioned above. Also the list of activities as mentioned may not be exhaustive and depending on the complexity of the project, more activities may get added at each stage of the project. The fact that the execution stage involves varied activities underscores the need for computerised project monitoring techniques to ensure systematic project implementation. To illustrate, the construction of an irrigation project for canal works may include activities viz.

A.	Land Acquisition
B.	Earth work in Excavation
C.	Earth work in Embankment
D.	Construction of Structures
E.	Construction of Main Canal
F.	Canal Head Works
G.	Construction of Canal Distributaries (C.D) Works
H.	Concrete Lining
I.	Construction of Laterals
J.	Construction of Cross Regulator
K.	Construction of Field Irrigation Channels (FIC)

Reference : Evaluation reports, Technical Consultancy Services Organisation of Karnataka (TECSOK)

Whereas the construction/improvement of a road may include activities viz.

A.	Land Acquisition
B.	Resettlement and Rehabilitation
C.	Topographic Survey
D.	Design investigation and survey of existing pavement
E.	Soil Testing
F.	Utilities relocation and tree cutting
G.	Site Clearance
H.	Earthwork
I.	Construction of Non Bituminous Sub-base course
J.	Construction of Non Bituminous base course
K.	Construction of Bituminous surface course
L.	Construction of bridges/culverts, etc.
M.	Construction of pavement drainage
N.	Works for protection, pavement markers, signboards, road humps, etc.
O.	Construction of drains

Reference : DPR, KSHIP

Project Management Unit

1.6 ***The need for preparation and planning is critical at each stage of the project. Ideally, the project management activities for the project should be initiated at pre-execution stage. For this purpose, the Project Management Unit (PMU) should be identified early and activities such as need assessment studies, determining the basis for design conditions and calculations for financial viability, etc., should be taken up in co-ordination with the project management unit***. The project management unit could then prepare a Master Project Plan of project activities. As the project progresses into subsequent stages, the Master Project Plan could form the basis for baseline monitoring of the project. Further as other departments, agencies and vendors become part of the project during the pre-execution and execution stage of the project, each agency and vendor should prepare a project plan conforming with the Master Project Plan. Once the project is completed, the Project Management Unit could facilitate the handing over of the project to the end-user along with a maintenance plan for the initial few years of the project. The HR of PMU have to be well trained and oriented towards the management objectives and outcomes expected from the project. Hence professionalising the PMU and institutionalising the same are key interventions that must be initiated by the Government.

Project Reports

1.7 While it is essential that projects are completed on time and within the project budgeted cost, it is equally important that a project is able to effectively meet the needs of the end users. In this regard, Feasibility reports should examine the various options which could be adopted for meeting the project objectives. The Feasibility reports should review the Investment Options and the rationale for selection of the project based on an Economic rate of return. Further, Detailed Project Reports (DPRs) should define project outcomes in advance of the project execution. ***The DPRs should include a risk management plan to identify and monitor the risks associated with the project viz. likely factors which may cause time over runs, cost over runs and factors relating to stake holders in the project including the maintenance challenges. The role responsibilities (responsibilities for giving clearances) and interdependencies of the stakeholders could be made a part of the Detailed Project Report for each project. The risks and dependencies identified in the Detailed Project Reports could then be incorporated into the project plan.***

1.8 ***The Detailed Project Reports should include a time schedule of deliverables or activities using work break down structure.*** [4] ***In a work break down structure, project works are classified into activities with defined cost and time parameters.*** Such a process helps in estimation of Cost

[4] James P Lewis, Project planning scheduling and Control, Tata McGraw Hill, 2004, page 201.

as well as time required for each deliverable. Further, such a process could also be developed to work out advance estimates for cost and time schedules.

1.9 ***It should be made mandatory for completion reports to be filed for each project, once the Project is completed. The completion report could provide an understanding of the project with respect to objectives achieved and various factors encountered and addressed during the course of implementation for achievement of the project objectives. The Completion Report should contain a statement showing the project objectives achieved vis-à-vis the baseline data and outcome indicators as included in the Feasibility Report and Detailed Project Report. The completion report should also include a time schedule for maintenance of the project and a time schedule for evaluation study of the project atleast within the first three years after completion of the project.***

Project Management Techniques

1.10 Some of the techniques used in project management include the use of Earned Value Analysis Technique, Cost Performance Index and Schedule Performance Index.[5]

The Earned Value Technique objectively measures a project's accomplishments in respect of its performance against time, cost and quality targets. [6] Thus, in Earned Value Analysis, in the period being measured; the

a) Planned value i.e. amount that was planned to have been spent (planned physical progress (in percent) multiplied with the cost of Activity) or financial progress;
b) Earned Value i.e. amount that should have been spent to date based on what has been achieved (actual physical progress (in percent) multiplied with the cost of Activity) ;
c) Actual Value i.e. amount actually spent;

are analysed to calculate variations which include,

d) Cost variation, calculated as (Actual Value minus Planned value)
e) Schedule variation, calculated as (Earned Value minus Planned Value)
f) Schedule delay, calculated as (Number of days required to catch (up or lost) to achieve the difference of Earned Value and the Planned Value).

[5]James P Lewis, Project Planning, Scheduling and Control, 2004, Tata McGraw Hill, page 315
[6] Paul Roberts, Guide to Project Management , The Economist, 2009, page 188, 283

To illustrate,

If for an activity, for instance Earthwork for 100 cubic metres, the total cost is ₹ 50 crore, total scheduled time is 10 months and the at the time of review i.e. at the end of six months, actual physical progress achieved is 40 cubic metres against a target physical progress of 60 cubic metres, financial progress i.e. amount actually spent for the activity is ₹ 35 crore;

a)	Planned Value	planned physical progress (percent) x cost of activity	60 cubic metres / 100 cubic metres x ₹ 50 crore	₹ 30 crore
b)	Earned Value	actual physical progress (percent) x cost of activity	40 cubic metres / 100 cubic metres x ₹ 50 crore	₹ 20 crore
c)	Actual Value	Actual amount spent		₹ 35 crore
d)	Cost Variation	Actual value minus Planned Value	₹ 35 crore - ₹ 30 crore	₹ 5 crore
e)	Schedule variation*	Earned Value minus Planned value	₹ 20 crore – ₹ 30 crore	(-) ₹ 10 crore
f)	Schedule delay	Number of days to achieve Earned Value equal to the Planned Value	₹ 10 Crore / 50 crore (Total cost) x 10 months (Total time)	2 months

*Negative schedule variation indicates activity is behind schedule

1.11 Similarly, the Cost Performance Index is arrived at by comparing physical progress to the actual cost incurred for each activity as calculated at the time of review. For instance, if the actual cost spent is equal to the amount that should have been spent i.e. total cost of the activity multiplied by the actual physical progress achieved for the activity, then the Cost Performance Index for the activity is taken to be one (1). Thus, in road projects, for instance, if the cost of preparation of the sub-base layer is ₹ 100 lakh, and the physical progress achieved at the time of review is 60 percent, the amount that should have been spent (planned cost) is ₹ 60 lakh. If the actual cost incurred at the time of review is ₹ 90 lakh, the Cost Performance Index for the activity is 1.5 (90/60), indicating a cost overrun of 50 percent at the time of the mid-term review.

1.12 The Schedule performance Index for an activity in a project indicates the gap between the scheduled time and actual time taken for completion of the activity. Thus, at the time of review, if an activity for the project has achieved a physical progress of 25 percent when the scheduled (planned) physical progress should have been 50 percent, the Schedule Performance Index works out to 0.5 (25 percent/50 percent).

1.13 Thus by aggregating the Earned value for all the activities in the project, the Earned value for the project could be ascertained. The Cost Performance Index and Schedule Performance Index could also be similarly calculated for the entire project. Thus a better relationship between the financial progress and physical progress achieved could be determined for the project. Also, given that the Earned Value and the Schedule and Cost Indices are calculated for each activity as well as the entire project, the underlying factors causing project time and cost overruns for not just the project but also for each activity could be examined even during an mid-term review of the project. However, the above techniques could be used only if the Work Break down structure is followed for preparation of project time schedules and estimates of project cost. Therefore, the engineers and planners who are dealing with the project design and implementation need to be trained in financial aspects of project from the design stage itself.

1.14 The project delays observed in a large number of Infrastructure projects could be largely attributed to inadequate co-ordination between multiple agencies. Often lack of proper/effective co-ordination between the agencies lead to delay in approval of action plans, land acquisition, laying of utilities, etc. In such cases, ***there is a need to define roles and responsibilities of each one of the multiple agencies during the pre-execution stage of the project. Such kind of defining the roles and responsibilities are more important for executing projects in PPP mode, as any delay in PPP projects would increase contingent liability on government***. In every project, a Project Governance Report [7] describing targets to be met, description of the roles, responsibilities and reporting lines of those involved in the project management team should be made a part of the Project Report and execution process. It may be worthwhile emulating the approach taken by some external agencies implementing Projects in the State, whereby it is ensured that ***the Memorandum of Understanding (MoU) is entered into between the different agencies involved in the project during the pre-execution stage of the Project. Such bottlenecks could also be mitigated by establishing a third party project management unit to co-ordinate between departments, flag delays, and monitor progress under the various project parameters***.

Use of IT in project Management

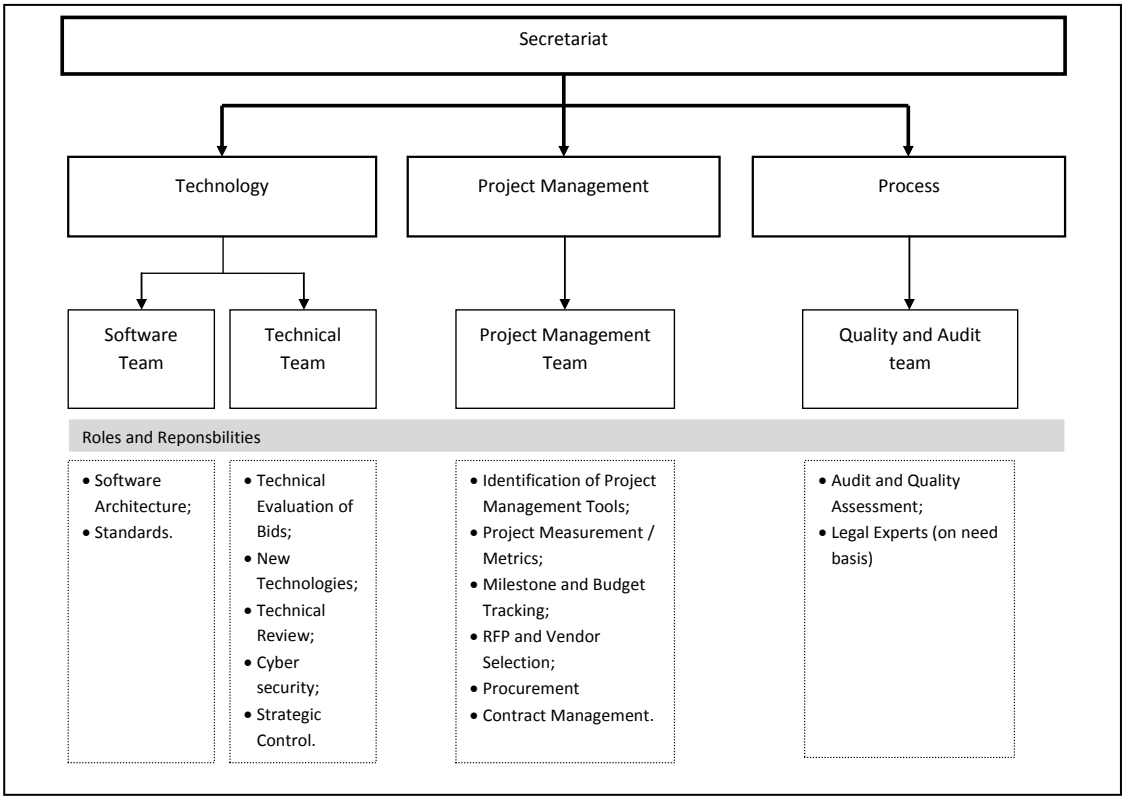
1.15 The use of IT and IT enabled technologies ensures that project management is better practised, productivity of resources is raised, and cost over-runs are contained. ***The departments should therefore actively seek support and co-ordination from the e-Governance Department for setting up the infrastructure for IT based project management***. The Department may also take note of the Guidelines [8] issued by the Government of India to the IT Secretaries of the State Governments for setting up Dedicated Project Team for e-Governance.

[7] Paul Roberts, Guide to Project Management, The Economist, 2009, page Table 8.8, page 146

[8] Circular No. 7(1)/2009-EG-I dated November 16, 2010 issued by the Department of Information Technology, Ministry of Communications and Information Technology, Government of India.

The following chart provides suggestions for setting up such a team for monitoring of projects in the State.

Suggested Team for e-governance for Project Management



Reference : Annexure – I, Detailed composition of dedicated project team; based on the guidelines issued by GoI
Note : The organisation structure as suggested by the circular has been modified in terms of roles and responsibilities;

Some of the roles and responsibilities of e-Governance to seamlessly integrate the objectives of project management would include;

- Contract Management;
- Measuring and monitoring of Project Metrics;
- Milestone based project tracking;
- Incident tracking and resolution;
- Managing Change in requirements;
- Introduction of Project Management tools for the project;
- Periodic project audit and quality reviews;
- Knowledge management and best practices.

As the communication channels of the world get integrated, Governments across the world are making active use of Internet and web Technologies to deliver end to end services and to improve governance. Citizens themselves expect more online information and services from governments. [9] Apart from providing an ideal platform for monitoring of the activities of the Government, the use of such technologies also enables the Government to document and learn from past lessons

[9] Circular for Guidelines issued by the Government of India to the IT secretaries of the State Governments for setting up Dedicated Project Team for e-Governance

and experiences. A dedicated knowledge management Centre may be set up at Government Training Institute like ATI, FPI to document the best practices from each project and develop training modules for the use of PMUs.

Capacity Building for Institutional Memory

1.16 Given that the project management unit is central to the project, ***it is essential that the projects are strengthened with institutional capacities for project development and project management. Going forward, it is equally essential that the institutional capacity is mainstreamed / internalised into the existing departmental structures in order to build up in-house expertise. For this purpose, regular training and capacity building should be built into the departments' organisation structure.*** Focus on awareness building, sharing of experiences and maintenance of a robust database of past projects not only helps in improved efficiency in implementation, but also helps foster morale and better team spirit for subsequent projects.

1.17 ***In the case of high value projects exceeding ₹ 5 crores, particularly those relating to infrastructure, a project management approach should be adopted similar to the one followed by the Public Works Department for projects in KRDCL and KSHIP. This project management approach should be dovetailed with existing e-governance practices such as e-tendering, e-procurement, etc., already being used by the departments.***

1.18 ***A database of projects executed in the past should be developed, which could be used to understand the various challenges faced by the department in different districts. Similar to the Departmental MIS reports in the State, Project Management Dashboards [10] could be prepared which include the comparison of initial base line parameters with actual completion parameters, time schedules, etc.*** Thus, while planning for subsequent projects, these Dashboards could be used to incorporate lessons from the rich database of information regarding reasons for cost and time over run of similar projects in the past.

1.19 ***The departments should undertake skill development of personnel associated with the project. It is also desirable that engineers from the various agencies and contractors are also involved in co-ordinated project management training programmes prior to the commencement of the project. Such co-ordinated project management training programmes could be made a part of the tender conditions.***

[10] Paul Roberts, Guide to Project Management, The Economist, 2009, Figure 9.2, page 175

Chapter 2

Public Works Department

Introduction

2.1 The Secretariat Department of Public Works, Ports and Inland Water Transport Department (PWPIWTD) is in charge of all matters relating to public works which includes Buildings, Roads and Bridges, Ports and Inland Water Transport.

2.2 Road projects are financed not only from State Budgetary resources and the Central Road Fund, but also with the help of assistance in the form of long term loans from the World Bank, ADB and NABARD.

2.3 The main areas of concern in the PWD are (i) inadequate assessment of need and appropriateness of the design of road projects,(ii) design and construction of buildings without regard either to optimum use of space and materials to suit the needs of the user Department, or to ease of maintenance (iii) cost over runs (iv) lack of objectivity and transparency in the selection of works, (v) incomplete DPRs,(vi) poor planning and co-ordination between agencies involved shifting of utilities, (vii) absence of a robust organisation structure to match the Department's mandate and (viii) lack of professional training either in new technology or in project management skills.

2.4 The Commission, in its first report to the Government in February 2010, had made the following recommendations:

i. *A State Highways Authority of Karnataka (KSHA) should be created on the lines of National Highway Authority of India (NHAI). (Para 4.2.4, 1)*
ii. *The relevance of KRDCL and its continuation be reassessed in the context of creation of the State Highways Authority, and the State Highways Act be amended suitably. The Act may provide for financing the Authority, by creating a Road Fund which would have access to borrowed funds from the market, receive government grants, toll receipts, and betterment charges to be levied on lands along the highways constructed. The Authority could also generate revenue from sale / lease of commercial property to be created on the Highways as part of public utilities, while retaining the existing objective of containing ribbon development along the State Highways.(Para 4.2.4, 1)*
iii. *Such Authority can be entrusted with O & M operations of existing Highways, building new roads, converting 2 lane roads to 4 lane / 6 lane roads, major improvement / strengthening of roads, etc. Optimally, renewal (costing approx. ₹ 15 lakhs per Km as per present cost) should be carried out every 3-5 years and strengthening of Roads (costing*

approx. 1.5 crore per Km) should be carried out once in ten years. The Authority should have updated 'Road Condition Database'. (Para 4.2.4, 2)

iv. *A specific Strategic Option Study (SOS) be carried out for State Highways excluding the roads under KSHIP II for which agreement has been signed with the World Bank. About 10,000 Kms. of road length according to priority listed in the SOS could be taken up for improvement in stages under this "Special Programme on State Highways". Funds required for this have to be raised from external Agencies (e.g. ADB) State Budgetary support, Borrowing from the market, including HUDCO, etc. The State Government could think of levying a cess on Petroleum Products (Petrol & Diesel) for partly financing this special Programme.(Para 4.2.4, 3)*

v. *Projects have to be proposed with regard to traffic density, DPR should be prepared and subjected to detailed project - Appraisal. Standards set by Indian Road Congress (IRC) for new roads and widening of roads, construction of bypasses have to be followed.(Para 4.2.4, 4)*

vi. *Project Management Consultants (PMC) be attached to every project above a threshold limit (say, ₹ 10 crore) in order to ensure that DPR is prepared as per standards and to support the department during the project execution stage.(Para 4.2.4, 5)*

vii. *Before bid process is set in motion at least 80% land has to be acquired to avoid delay associated with land acquisition and handing over.(Para 4.2.4, 6)*

viii. *For timely shifting of utilities on the Right Of Way (ROW), an inter-departmental committee at district level could be constituted. (Para 4.2.4, 7)*

ix. *It should be mandatory that proper project design be done at DPRs stage to avoid time and cost over runs. DPR should also identify implementation constraints such as clearing of encumbrances, time required for environmental clearances or railway approvals, etc., (Para 4.2.4, 8)*

x. *Revising the estimates for any project has to be normally avoided. If it is at all necessary, such estimates have to be prepared by the time fifty percent of project is completed. Thereafter no upward revision should be undertaken.(Para 4.2.4, 9)*

xi. *The period of Project maintenance, by the contractors / executing agency needs to be extended from present one year to three years.(Para 4.2.4, 10)*

xii. *Numerical identification/numbering of roads be extended to district and Zilla Panchayat roads in line with numeric identification used in National Highways. Such numbers have to be brought into public domain, and the projects be identified for repairing and strengthening with such numbers.(Para 4.2.4, 11)*

xiii. *Roads should not be upgraded from MDRs to State Highways without providing for an O & M Plan.(Para 4.2.4, 12)*

xiv. *Field level officers of PWD should be given intensive training in the use of e-tendering platform. Further, it is recommended to depute officers of all Infrastructure Departments*

(including PWD) to Project Management Institute (PMI) for in-service Training. (Para 4.2.4, 13)

xv. The PWD should prepare a district wise panel of Architects and Engineers to prepare designs in time for execution. Similarly, a panel of independent inspectors / institutions for third party quality validation of works should be prepared. (Para 4.2.4, 14)

xvi. PWD should prepare type designs and standard estimates for buildings for schools, colleges, hostels, taluk offices, courts, primary health centres, etc., to minimise time taken for preparation of plans and estimates and to achieve economy in construction. (Para 4.2.4, 15)

While reiterating the above, certain additional recommendations and guidelines are given in this Report, which should be followed for objective selection, implementation and evaluation of projects. ***The Commission has examined the project selection guidelines followed for road projects aided by external agencies and recommends that the same may be adopted for road projects taken up through state funding implementation. The report also stresses the need for regular evaluation study as a part of road projects and recommends that the department take up separate study econometric evaluation of roads in the state***. The Commission also recommends the creation of separate cadres of engineers for the three Infrastructure departments viz. Water Resources Department, Urban Infrastructure Department and the Public Works department.

2.5 Broadly, PWD buildings fall under two categories viz., institutional / commercial buildings and residential buildings. The first category consists of office buildings, commercial complexes, colleges, hospitals, libraries, etc. Residential buildings include quarters and hostels. The estimated capital cost of buildings under the PWPIWTD (Public Works, Ports and Inland Water Transport Department) as on March 2010 is ₹ 917 crore, of which ₹ 247 crore is for residential buildings and ₹ 670 crore for non residential buildings. The C&AG Audit Report (Civil) for the year ended 31.03.2009 has observed that the Department is not in a position to know the complete picture of the assets held or created at any point of time, due to non maintenance of registers. [11] In view of the incompleteness of asset register and the likely undervaluation of assets, it would appear that the budget estimates for operation and maintenance of buildings are based on adhoc assumptions. ***The Commission recommends that the PWD should update the asset registers and get the same validated by independent agencies. Although preparation of an asset register complying with Audit standards may take time, the department should make a beginning to prepare an***

[11] As noted from the C&AG report, paragraph 348 of Departmental code provides that the DO (Divisional Officer) shall maintain a register in prescribed form for each class of assets created and land acquired. The registers in Form no. PWG-81, should show separately the value of land, value of the building thereon and the value of each separate structure. In case of purchased property, the register should apportion the price paid between the various items comprising the property e.g. land, main building, servant quarters, compound wall, well etc. The capital value of any portion of building which is abandoned or dismantled without replacement should be written off the total capital of the building.

inventory of its assets immediately, and upgrade the same into a full-fledged comprehensive register within two years.

2.6 The PWD undertakes two types of repairs for the maintenance of buildings, viz., ordinary repairs and special repairs. Ordinary repairs are carried out annually, and include activities such as white washing, colour washing, repairs of patches, replacement of small broken parts, painting of doors, etc. Special repairs are less frequent and include repairs to damaged portions of floors, doors and windows in buildings, and replacement of water supply and sanitary fittings. The division wise breakup of the major buildings is as follow:

CHIEF ENGINEER, C & B (NORTH)		**CHIEF ENGINEER, C & B (SOUTH)**	
Name of the Division	**No. of Buildings**	**Name of the Division**	**No. of Buildings**
Dharwad	11	No. 1, Buildings Division, Bangalore	9
Gadag	6	No. 2, Buildings Division, Bangalore	6
Haveri	10	ESI Buildings Division, Bangalore	4
Karwar	5	Mysore Buildings Division	4
Belgaum	4	Bangalore	6
Bijapur	4	Kolar	10
Bagalkot	4	Tumkur	14
Bellary	3	Mysore	8
Raichur	3	Chamarajanagar	6
Koppal	3	Chickamagalur	8
Gulbarga	2	Mandya	7
Yadgir	3	Hassan	7
Bidar	2	Shimoga	8
		Chitradurga	8
		Davangere	6
		Mangalore	6
		Udupi	5
		Madikeri	5
Total	60	Total	127

2.7 The Department's responsibility relating to development of roads includes construction of new roads, strengthening and widening of existing roads, and the maintenance of national highways, state highways and Major District Roads (MDRs) in the State. The construction and maintenance expenditure for national highways is borne by the Government of India and the construction and maintenance of state highways and MDRs is borne by the State Government. The development of roads and bridges also include the construction of new bridges and the maintenance of bridges along the various roads in Karnataka.

2.8 As at the end of March 2010, there were 4490 km length of National highways, 20,905 km. length of State highways and 47,836 km. length of Major District roads in Karnataka. Of the 73,231 km. of road length, about 90 percent had hard rigid pavement (cement concrete) and black top surface and about 8 percent being Water Bound Macadam roads. Out of 20,905 km. of State Highways, about 46 percent were single lane roads, about 12 percent were two lane roads. A detailed break-up is given in Annexure 2.b.

2.9 Karnataka has a maritime coastline of 300 kilometres with ten Minor Ports under the State's control. Annexure 2.c provides details regarding the location, features, facilities provided, revenue earned and traffic handled at the ten ports in the state. For the year 2009-10, the revenue receipts from these ports was ₹ 2,928.6 lakhs, with total exports of around 80 lakh metric tonnes and imports of around 6 lakh metric tonnes.

2.10 The Inland Water Transport wing was created under the Department of Ports in the year 1972 for the administration, maintenance, control and regulation of the Ferries and Waterways in Karnataka. Under this Wing, there about 366 ferry services in the state, out of which 15 services are managed by the department using mechanised boats, 63 are run by auction lease under the supervision of the department, and 288 are operated through Zilla Panchayat /Tourism/Forest department and other agencies. For the year 2009-10, the ferry services under the departmental management have handled 12.36 lakh passengers, 4.6 metric tonnes of cargo and about 1.35 vehicles. The revenue receipts in respect of Inland Water Transport is ₹ 42.5 lakhs.

Organisation Structure – PWPIWTD

2.11 At the Secretariat level, the Department is headed by a Principal Secretary and a Secretary (Technical Officer). Annexure 2.a provides the organisation chart for the PWPIWTD.

2.12 The Department has three Zones for dealing with work relating to buildings, roads and bridges at the field level, viz. Communication and Buildings (C&B) South Zone, (C&B) North Zone and National Highways. Each Zone is headed by a Chief Engineer. The Zonal offices consist of Circles and Divisions. Each Circle is headed by a Superintending Engineer, and each Divisions by an Executive Engineers. Each Zone comprises a hierarchy of several Circles and Divisions, with a Chief Engineer at the Head of the Zone, a Superintending Engineer at each Circle and an Executive Engineer heading each Division. The Communication & Buildings (South Zone) divided into 6 Circles and 20 Divisions. The Communication & Buildings (North Zone) is divided into 4 Circles and 15 Divisions. The Chief Architect, Bangalore is in charge of preparation of Architectural drawings pertaining to various functional buildings in Karnataka.

2.13 The National Highways Zone is divided into two Circles and seven Divisions. The Chief Engineer, National Highway is primarily entrusted with the responsibility of carrying out the works of the National Highway Authority of India (NHAI) and the Ministry of Road Transport & Highways (MoRT&H).

2.14 The Karnataka State Highway Improvement Project (KSHIP) has been set up for the development of State highways in Karnataka, with a Project Director and Project Implementation Unit headed by a Chief Project Officer.

2.15 Apart from this, the Karnataka Road Development Corporation Limited (KRDCL) established in 1999 is a wholly owned Government of Karnataka enterprise for development of road infrastructure in the State. The Corporation raises loans from Financial Institutions through bonds for the development of roads and bridges in the State. The Corporation is headed by the Managing Director (KRDCL).

2.16 The Director of Ports and Inland Water Transport at Karwar handles matters of the state connected with Ports, Shipping and Inland Water Transport and also coastal protection works.

Schemes in the Public Works, Ports and Inland Water Transport Department

2.17 Annexure 2.d provides details regarding financial and physical targets and achievements under State Sector Schemes during 2009-10. During the year 2009-10, the Department incurred an expenditure of ₹ 1745 crore against a financial target of ₹ 1752 crore. Plan Schemes pertain to construction of new infrastructure i.e. creation of assets whereas the non Plan items cover maintenance of roads, bridges and buildings and expenditure on staff. For the year 2009-10, the PWD incurred an expenditure of ₹ 143 crore on maintenance of buildings and ₹ 314 crore on maintenance of roads and bridges.

2.18 The source of funding for construction and maintenance of roads is as follows:

a. Central Road Fund (CRF)
b. External funding through Karnataka State Highways Improvement Project (KSHIP-I and KSHIP-II)
c. NABARD Loan Assistance

a. Central Road Fund (CRF)

Funds released under the CRF by the Government of India are shared by both the National Highways and Communications and Buildings (South and North Zone). For the year 2009-10, works taken-up involved an expenditure of ₹ 205 crore.

b. Karnataka State Highways Improvement Project (KSHIP)

Under KSHIP-I, for the period 2001-2010, an amount of ₹ 2,346 crore was spent for the development of 2,385 km of State highways. The project road length was spread over 19 districts of the state and was taken up in 50 packages. Eighty percent of the project cost was borne under World Bank loan and the balance was met from State budgetary resources. Under the project 2,384 km has been completed and opened to traffic.

Under KSHIP-II, it is proposed to improve 3,411 km. of state highways included in the core Road Network in the State. Under Phase-1 of the project, a road length of 831 km. is proposed to be upgraded to 2-lane level under World Bank finance and 616 km. is proposed for improvement under ADB finance. Preparation of the Detailed Project Report for 3411 km. is completed and the bidding process is in progress as on 31 March 2010.

Acquisition of land required for the Project is proposed to be taken up under the Karnataka State Highways Act, (KSHA) 1964. Under this Act, after the publication of an initial notification by the State Government in the official Gazette declaring that the land is needed, the Government may direct that the land be taken possession of and from such date the said land shall vest absolutely in the State Government free from all encumbrances. [12] Land acquisition under this Act is thus much quicker as compared to the process laid down in KIADB Act, which requires a thirty day window to be maintained between declaration and acquisition, as well as the Land Acquisition Act [13] which involves a lengthy process including action under Section 4(i) (Preliminary Notification), Section 5A (measurement), hearing of objections, declaration under Section 6, enquiry into claims and then passing of orders relating to valuation**.** The power vested under section 15 and section 19 of KSHA implicitly assumes that (a) the alignment of road is to provide optimum mobility to road users and (b) also design of such alignment is technically the best option. Hence while invoking the power to acquire land under the said provisions, ***it should be mandatory that a technical feasibility study, justifying the alignment of the road as the best option, is available to the State Government.***

c. Construction of Bridges and Development of Roads under NABARD Loan Assistance:

As on 31 March 2010, under Rural Infrastructure Development Fund (RIDF) for improvement of rural roads, 4,831 works had been taken up, of which 3,902 works had been completed and 929

[12] Section 15. Acquisition of land or right or interest in land; and Section 19. Taking possession of land; The Karnataka State Highway Act, 1964

[13] Section 4 to 17, Part II - Acquisition, The Land Acquisition Act, 1894.

works are in progress. An expenditure of ₹ 2,272 crore was incurred and the total loan availed stands at ₹ 1,759 crore.

2.19 Original works as well as maintenance of National Highways in the State is under the jurisdiction of PWPIWTD, with the expenditure borne by Government of India. There are 15 highways aggregating 4,490 km. passing through the Karnataka State. For 2009-10, the outlay was ₹ 305 crore for original works and ₹ 60 crore for maintenance and repair works. Apart from strengthening of roads and improvements to major and minor bridges under 110 works, about 60 km. of widening and 383 km of IRQP (Improvement of Riding Quality Programme) was completed with an expenditure of ₹ 305 crore.

2.20 In addition to above, the Karnataka Road Development Corporation Limited (KRDCL) takes up development programmes for Roads, bridges and other related infrastructure development works connected with surface transport. The Source of funding for KRDCL includes budget provisions for specific projects, and toll collections on roads transferred to the Corporation by the State Government. KRDCL has taken up various projects for implementation and has received ₹ 805 crore from HUDCO. Annexure 2.e provides details of the projects taken up by KRDCL during the year 2009-10. Construction of works for about 989 km. of roads with project cost of ₹ 1,367 crore and 763 Bridges have been undertaken at a project cost of ₹ 825 crore .

2.21 The PWD is required to undertake regular upgradation of Ports that have potential revenue generation capacities. Karwar Port is being upgraded to handle better and increased berthing and docking facilities for large sea faring vessels. The State Government has also decided to start container handling facility at this port. For the year 2009-10, an expenditure of ₹ 634 lakh was incurred for the development of ports which included ₹ 260 lakh for development of Karwar Port and ₹ 230 lakh for development of Old Mangalore Port, the balance being for the remaining minor ports in Karnataka. In order to address sea erosion and protect the properties of local communities, the construction of seawalls was undertaken under Coastal protection works. During the year 2009-10, an expenditure of ₹ 787 lakh was incurred for construction of about 1930 meters of seawalls in Kundapur, Honnavar and Kumta Taluks.

Project Identification, Selection and Implementation

2.22 Annexure 2.f provides a comparison of the Karnataka road network with the road network in Maharashtra, Andhra Pradesh, Kerala and Tamil Nadu. Karnataka has the second highest Road length/sq km among the States compared, the highest being Tamil Nadu. Out of the total length of roads in the State, Village roads in Karnataka comprise 65 percent (the same as in Tamil Nadu),

while State highways in Karnataka constitute 10 percent, as compared to 16 percent in Kerala and 14 percent in Maharashtra.

2.23 One of the key issues that delays the work in PWD is preparation of Appendix E. As part of 'Anusthana Parva' for Administrative reforms announced in Budget 2009-10, a schedule of projects in 'Appendix E' is required to be prepared by April, 2010 and necessary allocation is required to be provided in accordance with the implementation Schedule. In respect of works with estimates of less than ₹ 5 crore, there should be a minimum provision of 40% in the first year and the works should be completed in the second year by providing the remaining 60% of the required amount. Detailed estimates of budget allocations that have a bearing on the creation and maintenance of buildings, roads, bridges, ports and housing is presented to the legislature. The estimates comprise disaggregated data on allocations for infrastructure creation in the state and subsequently an Appendix – E document carrying details of works proposed is prepared by the line department after the budget is passed. However, the PWD often finalises Appendix-E only in the 3rd quarter or some-times in the 4th quarter of the year. In the absence of Appendix-E, the field level persons of PWD are unable to firm up their respective Monthly Programme Implementation Calendar (MPIC) and thus are deprived of utilising the allocated funds according to a pre-specified plan of action.

2.24 During its meeting with the Departmental officials, the Commission noted that the construction of new roads is often decided on the basis of priorities mostly determined by people's representatives and not on the basis of any objective Cost: Benefit analysis. Similarly many village roads are converted into Major District Roads (MDRs) and MDRs into State Highways in an arbitrary manner. As per IRC norms, 60% of the budget of the Department should be spent on maintenance and 40% on creation of new assets. In actual practice, nearly 70% of the budget allocation is spent on new assets and about 30% is spent on maintenance, resulting in poor maintenance of roads. In this regard, the Commission is of the view that the ***PWD should not take up any roads for construction without finalising funding, and the selection of roads should be more objective. Also periodic maintenance of the roads should be conducted in a more scientific manner by maintaining an information system to ensure that the roads taken up for maintenance is not repetitive in nature and that all roads are covered within a time frame. With the increase in the number of roads throughout the State, there is a need to prioritize on widening and strengthening of roads and creation of new assets after a thorough understanding of the needs based on objective project selection criteria***.

2.25 The Department could learn from the experience of KSHIP to construct roads more efficiently through a project based approach and internalize such learning. Table-1 below shows the kind of pre-project reports used for launching the project, the process of structured project selection, project reporting and documentation.

Table 1: Project Reports prepared as part of KSHIP-1

Report	**Objective of the report**
Strategic Option Studies	• Identification of Roads to be taken up for Development
Feasibility Study	• Identification of Investment Options, • Selection of roads using EIRR
Detailed Project Report	• Identification of Project objectives and outcome indicators • Detailed Engineering Study • Detailed Topographic Studies • Design of road based on study of actual condition of roads • Social and Environmental mitigation plan • Calculation of Final Project Cost
Road User Satisfaction Survey	• Feedback of stakeholders about the Project objectives and outcomes
Implementation Completion Report	• Evaluation of Project Results

Source: KSHIP

2.26 As could be seen above, the Strategic Option Studies (SOS) is prepared before including the works in the programme of works under Externally Aided Projects (EAP). In order to determine that the expenditure is in line with the mandate of the department, studies are undertaken to identify outcome indicators and outcome measurement parameters of the project. The roads are prioritized as per the norms of the external funding agencies after subjecting the identified roads to a Feasibility study. The Investment options based on Economic Internal Rate of Return (EIRR) and Social and Environmental factors are worked out. In the selection of roads, 80% weightage is accorded to Economic Internal Rate of Return (EIRR) and 20% weightage to Deprivation Index (DI) derived from Dr. Nanjundappa Report. Generally roads having EIRR of higher than 12% are selected for improvement under the Project. Based on investment options arising out of the Feasibility Study, Detailed Project Reports (DPRs) are prepared. In addition to final project cost, the DPRs include a detailed engineering study on the basis of topographic

studies, actual condition of roads and structures, as well as detailed plans for mitigation of social and environmental impact. As per the norms of the funding agency, the project objectives and outcome are subjected to feedback of the stakeholders and public by conducting Road User Satisfaction Surveys three times in the project period. On completion of the project, an evaluation report termed as the 'Implementation Completion Report' is prepared, wherein outcome parameters like reduction in travel time, accidents, etc., are studied and documented.

2.27 By contrast, it was noted by the consultants appointed by the Expenditure Reforms Commission to study the process followed in the Department for projects other than KSHIP Roads that, in a number of cases, only line estimates are prepared and projects are awarded on a turnkey basis to the contractors. Subsequently the contractors have prepared detailed estimates based on site conditions after carrying out the required investigations; resulting in alterations to the scope of work awarded. Often such alterations and additions to the work-in-progress have resulted in time and cost over-runs. Proper approvals were not obtained when the revised estimates were carried out. The consultants have also found that though the outcome of the project is explained in the DPR, the outcome measurements, and the evaluation of the outcomes achieved by the project are not carried out for the projects implemented under the Public Works Department. Often, contractors take up road projects with a short term mindset, without any regard to durability and good quality of work. Consequently, the quality of the roads starts to deteriorate after just one year of completion leading to repetitive maintenance of roads which is avoidable. It is reasonable to surmise that repeated lapses on this count often appear to be results of malafide intentions or actions on the part of officials and contractors entrusted with the planning, execution and quality control of these major projects.

2.28 The C&AG Audit Report (Civil) 2009 in its evaluation of Internal Control in Public Works, Ports & Inland Water Transport Department also noted non-compliance with rules, manuals and codes in

a. Budget preparation,
b. expenditure control,
c. accountal of transactions,
d. quality control of Works executed,
e. inventory control, etc.

The CAG audit also observed that Budget formulation was deficient due to delayed submission of work estimates by controlling officers to the Finance Department. The delayed circulation of Appendix-E to implementing officers and inclusion of unapproved works have affected execution of works. Deficiencies in operational controls included instances of payments without check measurements by divisional officers. The Monitoring cell at Secretariat level was largely non-functional. These deficiencies are of serious nature and need a systemic and time bound approach

to be set right. Such instances imply that the actions by officials/contractors attract penal provisions. Therefore the department needs to institute prompt enquiry and trail to establish guilt and punish the guilty officers as a demonstrative deterrent measure. Simultaneously, proper training and orientation inculcated to induce a high degree of integrity and commitment, especially at senior levels, needs to be to be ensured so that the large amounts set apart for these major works are not subject to misappropriation or mis-use by unscrupulous, corrupt officials. A combination of honesty of purpose along with establishment and strict enforcement of clear cut, foolproof systems and procedures is the only way to prevent misuse of funds and shoddy execution of works that is seen so often in Departments entrusted with large infrastructure Projects.

2.29 A flow chart on the process of project selection and implementation followed by the Public Works Department is shown in Annexure 2.g. During its discussions with the departmental officials, the Commission noted that time and cost overruns are a cause of concern in a large number of projects taken up by the PWD other than KSHIP. Most of the cost overruns are due to inadequate preparation of DPR, where all the project items are not covered in the initial estimates, such as for instance in building projects, where works are proposed without including landscaping, interiors, etc. Another reason for project delays in the case of roads is the commencement of works without sufficient funds. Addition of works to the project midway into the project, extra item rate list, [14] work-slip [15] were also found to be some of the reasons for cost escalations. In this regard, it is essential that the Schedule of Rates is made exhaustive and the Bill of Quantities are estimated realistically by avoiding underestimation of quantities and taking into account likely changes during project.

2.30 ***The Commission recommends that, drawing lessons from the method of Project Selection and implementation adopted in externally aided projects in the State, the Public Works Department should establish similar procedures for projects financed from the State Government budget. Detailed feasibility and project report should be ensured for each project to reduce the extent of arbitrariness in scheme selection in the PWD Road development works. Further, it is recommended that a review of the project outcome indicators should be carried out after completion of project execution.***

[14] An extra item rate list is prepared in lieu of an item of work not included in the Schedule of Rates and the Bill of Quantities; therefore if a work activity, which is not included in the Schedule of Rates/Bill of Quantities, is executed in the project, the contractor has to be paid on the basis of an extra-item rate i.e. a rate calculated with reference to prevailing market rates when the work has been executed.

[15] A work-slip refers to a list of activities carried out, for which the quantities have exceeded the estimates as worked out in the Bill of Quantities.

2.31 Under KSHIP-II, the positive impacts of a road project includes better connectivity, faster access to medical and educational facilities, better employment opportunities and improvement in trading and industrial activity. [16] A better road network not only has an economic impact but also provides mobility to road users, influences location/relocation decisions for residencies, commercial and other institutional establishments in the Peri-urban. ***PWD needs to take up a separate study of the overall contribution of important roads to the State economy. The study could examine the economic impact of roads on, industrialisation, exports, contribution to State Domestic Product (SDP) , State's tax revenue, etc. The study of economic parameters could be entrusted to institutions with ability to conduct econometric analysis of such issues.***

Karnataka State Highways, Traffic and Transport Authority (KSHTTA)

2.32 Section 4 of the Karnataka State Highways Act, 1964, provides for the State Government to appoint a State Highways Authority for all highways in the State. Under Section 5 of the Act, the State Highways Authority interalia, shall exercise powers (i) for the restriction of ribbon development along highways, (ii) for the prevention and removal of encroachments, and (iii) can undertake the construction, maintenance, development or improvement of highways. In the Government Order No.PWD 71 EAP 2001 dated 15-3-2001, the Karnataka State Highways Authority was established under Karnataka Highways Act 1964 under the Chairmanship of the Additional Chief Secretary to Government with 11members, 6 from Government and 5 from Private Sector. In the Government Order it was also stated that the Karnataka State Highway Authority (KSHA) would be an Advisory Body on matters relating to planned development of Highways in the State. In order to truly reflect the coverage of the Authority it was felt necessary to rename the Authority as the "Karnataka State Highways, Traffic & Transport Authority". The Authority is currently acting as an advisory body for the highways, traffic & transport covering the entire transport sector. The Authority is thus covering human resource development, construction, maintenance, up gradation, etc., pertaining to highways. It is also mandated to address subjects such as traffic & road safety, and overloading. To have a clear sector strategy & a sector specific policy framework including an aspect relating to sectoral investment programme, the Authority supports the entire transport sector in its three sub-sectors of construction & maintenance of highways, traffic & road safety and transport.

2.33 Based on the provisions of the State Highways Act and guidelines by NHAI, the department has prepared a toll policy wherein flat toll rates have been worked out for two lane and four lane roads. Factors like willingness to pay, incidence of traffic and the viability of PPP funding for the projects have been factored in to calculate the toll rate. Considering the fact that National Highways are of superior quality as compared to State Highways, the base rates available

[16] DPR Report – KSHIP – II, April 2009.

in NHAI guidelines for 2008 have been taken for calculation of toll rates for 2009 for State Highways in Karnataka. This results in the toll rate for State Highways being about 10 percent lower than the toll rate for National highways. The toll rates for the state highways are also periodically adjusted to inflation. By levy of toll rates, the government will be able to recover the cost of road development. For the development of roads through the PPP mode, the government does not provide grants for certain works and the concessionaire (vendor selected through tendering for construction, maintenance and collection of tolls) would be able to recover the investment through collection of toll.

2.34 The State Highway Authority constituted in 2001as an Advisory body. As could be seen from the proceedings of the last meeting of the Authority held in January 2011, the authority proposes to monitor the tolling policy and set user charges. If the State Highway authority is entrusted with the task of construction (as permissible under section 5 of the Karnataka State Highway act) and if acquisition of land under section 15 and section 19 of the State highway act is envisaged in future, then tolling policy and fixing of user charges should be entrusted to a separate independent regulator to avoid any conflict of interest. Even otherwise, the authority now constituted will not be an appropriate body for fixing tolls on roads which may be constructed in future by various agencies including government, Public Private Participation (PPP) mode, department, SPVs, private party as government agent, etc. An independent regulator, on the model of the regulator in the energy sector should lay down norms regarding quality of roads, terms and conditions of getting roads constructed through PPP mode and tolling policy for roads, constructed by PWD or Highway authority or any private agency, PPP agency, etc. ***The Commission is of the view that a separate 'State Road Regulatory Authority' should be therefore appointed to function as a regulatory body for evolving and fixing road tariffs for various roads in the state. Fixing of tariff for use of 'Public Good' has to be done with a degree of independence, transparency and professional competency. Such a regulatory authority could look into the development of roads and ploughing back the collected user charges for the benefit of road users across the state. The regulatory body could also ensure compliance to standards on construction of roads and structures on land adjacent to the roads, road protection, safety features, other features like speed breakers, etc.***

2.35 During its district visits, the Commission noted that often buildings are designed and constructed without due regard to difficulty of maintenance of the buildings once the buildings are completed. Very high ceilings and deep domes lead to collection of dust and cob-webs since it requires specialized agency to carry out maintenance works in such buildings. ***There is need to follow uniformity in designing the public buildings. The Chief Architect of the department and the panel of architects should be encouraged to provide building designs which ensure features like environment friendliness, natural air and ventilations, etc. Also the Commission was of the***

view that the architects should be encouraged to design the buildings for easy maintenance after the completion of the building works.

2.36 As regards the construction of bridges by PWD, it is recommended that, ***taking into account the flow of water, quantity of water, land to be taken up for acquisition, the PWD could consult the Water Resources Department as to whether the bridge could be constructed as a bridge-cum-barrage as a means to create water bodies for watershed development and for utilising water for Irrigation and other purposes, etc.***

Schedule of Rates:

2.37 As per Para 327 of PWD Departmental Code, the Schedule of Rates (SR) are to be prepared by the Divisional officer in December every year, and forwarded to the Superintendent Engineer for sanction. Necessary analysis should be made and recorded of the rates accepted for each work described, and for varying conditions. The SRs are prepared by PWD and revised every year in the month of April. Various inputs are taken from the districts and local markets, including factors such as changes in cost of raw materials, labour charges, machinery required, etc. The Schedule of Rates are prepared circle wise and are finalised by the SR Committee chaired by a Superintending Engineer. The Commission recommends that the ***Committee for according approval to the Schedule of Rates should also include a representative of the Finance Department of the State Government and the rates, before they are firmed up, may be placed in public domain inviting suggestions and objections from the public and other user departments. Since the e-procurement platform is available, the Department should be able to collect prices quoted by vendors during atleast the last three years in respective circles, including those who did not win the bids, but quoted lower rates for some items. All such inputs should be considered for arriving at the Schedule of rates.***

Revision of PWD Code:

2.38 The Karnataka PWD code, compiled in 1965, is a document meant for the guidance of the officers of the Department. As recommended by the Public Accounts Committee (PAC), a Committee was set up in 1998 for revision of the code. The recommendations submitted by the Committee to the Government (1999) had to be further revised in the light of World Bank recommendations for procurement reforms and Karnataka Transparency in Public Procurement (KTPP) Act . Subsequently, the Committee constituted in 2004 for revision of the PWD Code and Stores manual has recommended revision of the Code to include provisions relating to Quality management and IT in construction. An official committee has been constituted comprising the heads of PWD, CPO KSHIP, MD KRDCL, etc., to review the recommendations of the revision

committee. The review has led to further modifications and certain chapters on IT in construction, etc., have been modified to suit present policy.

2.39 In the last 45 years since the compilation of the PWD code, several changes have occurred in the working environment of the officers of the PWD Department. For instance, computerization of documents and records has increased, and the use of IT and the internet have improved the efficiency of communication. Furthermore, several activities of the PWD such as Procurement, vendor selection, etc., are presently undertaken by the e-governance department through e-tendering and e-procurement. Going forward, activities like training and skill development, project monitoring, contract management, could be taken up in co-ordination with e-governance Department. The C&AG have pointed out in their Audit report[17], that the Departmental code has not been revised since its compilation in 1965. ***The Commission strongly recommends that the Government should bring out the revised PWD Code within the next three months.***

Quality Assurance:

2.40 The Commission appreciates the initiatives taken by the Government in terms of setting up a Task Force on Quality Assurance in Public Works by the Government Order dated 26.11.2008. The Terms of Reference for the Task force include formulation of guidelines for preparation of projects and ensuring quality in construction. The Task force could advise on appropriate specifications as per technical requirement to ensure quality, and suggest appropriate measures to ensure that these quality standards are maintained. The Task force may undertake a thorough check of the records and advise systemic changes to enhance performance. In this regard, the Commission is of the view that the ***Task force on Quality Assurance in Public Works should, inter-alia, set up norms for Technical audit of all large projects. Further the projects should be prioritized for technical audit based on the project cost. All Projects worth ₹ 10 crore and above and which have achieved physical progress of 50 percent, should be compulsorily submitted to a technical audit. Further the government should compile a Quality Control Manual and Quality Assurance manual for immediate dissemination to the project personnel, so that they can be trained in the appropriate skills to maintain the highest standards of quality in their execution of work.***

2.41 As on March 2010, PWD had vacancies of about 215 Assistant Engineers and 113 junior engineers. The Department also deputes engineers to Water resources department, Local Urban Bodies, BBMP, BDA, BMRCL, etc. The activities of the Departments of Water Resources, Urban Infrastructure Department and the Public Works are diverse, and the expertise called for in each of these Departments is generally distinctive to the respective Departments according to the nature of

[17] Audit Report (Civil) for the year ended 31 March 2009

the works executed. It is desirable to have an institutional focus on activities, and to develop in-house expertise and memory within each of the departments handling the works for Water Resources, Urban Infrastructure, and Public Works respectively. ***In line with the Karnataka Panchayat Raj Engineering Department Service cadre [18] constituted under the RDPR, separate engineering department/cadres for (i) "Urban Engineering",(ii) " Water Resources" and (iii) Roads, 'Bridges and Buildings' should be constituted. The engineers from the Public Works Department may be allowed to exercise an irrevocable option for absorption in one of three cadres mentioned above.***

Training:

2.42 The department has an ongoing training programme under which about 500 engineers are trained every year. The Commission recommends that ***engineers of the PWD should be also provided with higher education opportunities to pursue selected specialized Post-Graduate courses in appropriate areas such as highway planning, traffic planning, traffic engineering, transport economics, etc.***

[18] Notification no. RDP 139 Se Shi Ka 91, Bangalore dated 24th May 2008 for constitution of Rural Engineering Cadre called the Panchayat Raj Engineering Department

Chapter 3

Water Resources Department

Introduction

3.1 This chapter deals with key issues relating to efficiency of major, medium and minor irrigation projects in the context of (i) ensuring value for money being spent by the Department and its Special Purpose Vehicles, KBJNL, etc., and (ii) the extent of close convergence of core activities of the Water Resources Department with other departments like Energy, Agriculture and Co-operation. Accordingly, the key issues addressed here are delay in construction, proper maintenance of irrigation projects, and optimum use of scarce water. The Commission recognises (i) the objective of extending irrigation facilities across different parts of the state (ii) the equity considerations in providing irrigation to farmers of different sizes of land holdings (iii) the criticality of water as an input for non agricultural uses including domestic consumption and (iv) a sovereign state's obligation to ensure food and water security. Going forward, the Commission would like to draw attention of the Government to the need to translate the intentions of the State Water Policy 2002 with regard to the above objectives into operations. The recommendations in this chapter are oriented towards addressing these issues.

3.2 The State of Karnataka with a geographical area of 1,91,791 sq.km corresponds to 5.83 percent of the total area of the Country. Located in the Deccan Plateau, the State of Karnataka is the eighth highest state in the country in terms of geographical area. With the elevation of the ground levels between 450 metres to 900 metres above mean sea level, the state experiences varying climate with very humid rainy monsoon climate in the West Coast, the ghats and Malnad areas to Semi-arid warm dry climate in the East. Correspondingly, the rainfall in the State has large variation with higher amounts in the Western Ghats and reducing towards the eastern plains. The Coastal Dakshina Kannada District has recorded upto 4,000 mm of annual rainfall while the North-Eastern districts of Bijapur, Raichur, Bellary, etc., have recorded upto 500mm to 600mm of annual rainfall. The economically utilisable water potential for Irrigation in Karnataka is estimated to be 48,000 Mcum (Million Cubic metres) or 1,695 TMC (Thousand Million Cubic feet). Annexure 3.a provides details regarding the geo-climate conditions in Karnataka.

3.3 The Krishna and Cauvery River System comprises nearly 77 percent of the total drainage area of the seven river systems in Karnataka. On the other hand, the Pennar and Palar river systems have lower drainage area and comprise close to 8 percent of the total drainage area of the

seven river systems in Karnataka. Table 2 below shows the drainage area of the seven river systems in Karnataka.

Table 2: Area drained by various River systems in Karnataka

Sl. No.	River System	Drainage Area in '000 sq. km	Percentage
1.	Krishna	113	59
2.	Cauvery	34	18
3.	West Flowing Rivers	24	13
4.	North Pennar	7	4
5.	Godavari	4	2
6.	South Pennar	4	2
7.	Palar	3	2
	Total	**191**	**100**

Source : http://waterresources.kar.nic.in/river_systems.htm accessed on 17.03.2011

Annexure 3.b provides the details regarding the State wise catchment area of the river basins and its tributaries. Within the Krishna river basin, the tributary Bhima provides nearly 50 percent of the catchment area whereas within the Cauvery river basin, the Shimsha, Kabini and the Hemavathy tributaries provide nearly 70 percent of the catchment area.

Water Resources in Karnataka

3.4 Based on the river basin systems in the Karnataka and the catchment area provided by the tributaries, the utilisation of water resources for Karnataka has been apportioned among the river basins as shown in Table 3.

Table 3: Basin wise Master Plan

Sl.No.	Basin-wise description	Ultimate Utilisation in TMC
1.	Krishna	
(a)	As per the Krishna Tribunal's (Krishna Water Dispute Tribunal) allocation presently in force	734
(b)	Available to the state, in Krishna Basin, by way of Godavari Diversion to Krishna, as per Godavari Water Dispute Tribunal's (GWDT) award	23
(c)	As per the Krishna Tribunal's (Krishna Water Disputes Tribunal – II)	177
	Total for Krishna Basin	934
2.	Cauvery	270
3.	Godavari	22.37
4.	Other basins including west flowing rivers	1998.63
	Total for the state	3225

Source : Water Resources Department, Government of Karnataka, letter dt. 20.04.2011

Depending upon the extent of atchkat or Culturable Command Area (CCA), Irrigation projects are classified under major and medium categories. Projects involving CCA of 10,000 hectares or more is classified as Major Irrigation Projects, while irrigation with CCA between 2000 to 10,000 hectares are classified as Medium Irrigation Projects. Irrigation with CCA of less than 2,000 hectares is covered under minor irrigation. The ultimate Irrigation Potential for Karnataka from all sources has been estimated as 61 lakh hectares, out of which 35 Lakhs hectares are under major and medium irrigation, 10 lakh hectares are under minor irrigation and 16 lakh hectares is under ground water irrigation.

Water Resources Department (Major and Medium Irrigation)

3.5 The Water Resources Department undertakes the major and medium irrigation projects. The Department has three major corporations under its administrative control viz. KBJNL (Krishna Bhagya Jal Nigam Limited), KNNL (Karnataka Neeravari Nigam Limited) and CNNL (Cauvery Neeravari Nigam Limited) incorporated under Companies Act in 1994, 1998 and 2003 respectively. These Corporations are envisaged as Special Purpose Vehicles for speedy implementation of irrigation projects and for raising funds from the financial market. In addition to the Corporations, projects are also handled by Water Resources Department directly. Annexure 3.c provides the organization chart of the Water Resources Department. Apart from the corporations, other institutions constituting/assisting the Department are Water Resources Development Organisation (WRDO), Central Mechanical Organisation (CMO), Karnataka Engineering Research Station (KERS), Water and Land Management Institute (WALMI). Table 4 provides details regarding the Zones, Authorities, and Institutions forming part of the Water Resources Department.

Table 4: Zones and Institutions under Water Resources Department

Sl. No.	Name of the Zones / CADA	Name of the Nigam / Department
1.	The Chief Engineer, Water Resources Development Organisation , Bangalore	**Water Resources Department (WRD)**
2.	The Chief Engineer, Inter State Waters (W.R.D.O) Bangalore	
3.	The Chief Engineer, Hydrology and Central Mechanical Organisation, Bangalore	
4.	The Director, Karnataka Engineering Research Station, K.R.S.Mandya	
5.	The Director, Water and Land Management Institute, Dharwad	
6.	The Chief Engineer, Irrigation (N), Belgaum	**Karnataka Neeravari Nigam Limited (KNNL)**
7.	The Chief Engineer,Malaphrabha Project, Dharwad	Paid Up Capital : Rs. 7561 crore; Total Assets : Rs. 8353 Crore
8.	The Chief Engineer,Upper Bhadhra Project, Chitradurga	
9.	The Chief Engineer, Varahi Irrigation Project,Siddapur	Expenditure pending Capitalisation : Rs. 1626 crore
10.	The Chief Engineer, Upper Krishna Dam Zone, Almatti	**Krishna Bhagya Jal Nigam Limited (KBJNL)**
11.	The Chief Engineer, Canal Zone No.1, Bheemarayangudi	Paid Up Capital : Rs. 6987 crore; Total Assets : Rs. 11539 Crore
12.	The Chief Engineer, Canal Zone No.2, Kembhavi	
13.	The Chief Engineer, Operation and Maintenance Zone, Narayanapur	Turn over : Rs. 135 Crore
14.	The Chief Engineer, Irrigation (South) Mysore	**Cauvery Neeravari Nigam Limited (CNNL)**
15.	The Chief Engineer, Hemavathy Project, Gorur, Hassan	
16.	The Chief Engineer, Hemavathy Canal, Tumkur	Paid Up Capital : Rs. 4209 crore; Total Assets : Rs. 10882 Crore
17.	The Chief Engineer, Upper Tunga Project Zone, Shimoga	
18.	The Chief Engineer, Irrigation Central Zone, Munirabad	Expenditure pending Capitalisation : Rs. 1010 crore
19.	The Chief Engineer, Irrigation Project Zone, Gulbarga	
20.	The Administrator,Tungabhadra Command Area Development Authority, Munirabad	**Command Area Development Authority (CADA)**
21.	The Administrator,Malaprabha and Ghataprabha Project Command Area Development Authority, Belgaum	
22.	The Administrator, Cauvery Basin Projects Command Area Development Authority, Mysore	
23.	The Administrator, Upper Krishna Project Command Area Development Authority, Bheemarayanagudi	
24.	The Administrator,Bhadra Reservoir Project, Command Area Development Authority, Shimoga	
25.	The Administrator, Command Area Development Authority, Gulbarga	
26.	The Chief Engineer, Bagalkot Town Development Authority, Bagalkot	

Source : Website, Water Resources Department accessed 17.03.2011; Annual reports for 2009-10 for KBJNL, KNNL and CNNL.

3.6 Table 5 below provides details regarding Budget allocation for the various Irrigation projects in Karnataka including the three Nigams, Command Area Development Authorities (CADAs) and others. About 87 percent of the allocation goes to the Nigams, with about 37 percent going towards Capital Expenses and 16 percent towards debt servicing. Among the Nigams, KNNL implements most of the works under AIBP, SDP, SCP and TSP and receives about 50 percent of the allocations provided to the Nigams.

Table 5: Budget Allocation to Major and Medium Irrigation Projects, including CADAs for 2009-10

₹ In Lakhs

Description	**KBJNL**	**CNNL**	**KNNL**	**Total**	**percent**
Capital Expenses	37500	52305	54500	144305	37%
AIBP (Accelerated Irrigation Benefit Programme)	27296		63724	91020	24%
Debt Service	17200	24011	21800	63011	16%
SDP (Special Development Plan)	4000	4000	18000	26000	7%
SCP (Special Component Plan)	757	750	9150	10657	3%
TSP (Tribal Sub Plan)	106	90	2126	2322	1%
Total (Nigams)	**86859**	**81156**	**169300**	**337315**	**87%**
Total (Nigams) in percent	*26%*	*24%*	*50%*	*100%*	
CADAs				**9924**	3%
Other Non-Nigam related					
Works 4701 (Plan+Non Plan)				24417	6%
Maintenance 2701 (Plan + Non Plan)				10224	3%
Modernisation of TBLBC (Amount transferred to ICZ, Munirabad in BE and RE)				5000	1%
Total	**86859**	**81156**	**169300**	**386879**	**100%**

Source : Performance Budget 2009-10, Water Resources Department, Government of Karnataka, June 2010
Notes: 4701 : Capital outlay on Major and Medium Irrigation; 2701 : Major/Sub Major head for Major and Medium Irrigation; TBLBC : Tungabhadra Left Bank Canal, ICZ : Irrigation Central Zone,

Irrigation Projects in Karnataka

3.7 Of the 35 lakh ha of irrigation potential under major and medium irrigation, 24.6 lakh hectares has been created till March 2010. In the last two years, 14 projects have been completed. During year 2008-09, seven major and medium irrigation projects were completed with 47,201 hectares of irrigation potential created, and during the year 2009-10, 7 projects have been completed with creation of 66,701 hectares of irrigation potential. The details of the completed projects during the year 2009-10 are shown in Table 6:

Table 6: Major and Medium Irrigation project completed in 2009-10

Name of the Project	Irrigation Potential Created (ha)
Harangi	53520
Arkavathy	6102
Kamasamudra	382
Huchanakoplu	3360
Rajankollur	1097
Sonna LIS	1040
Itaga Sangama LIS	1200*

Source : Water Resources Department, Government of Karnataka, letter dt. 20.04.2011

(* 1200 Ha of suffering atchkat under distributary 11 of IBC)

3.8 In a Departmental report on Project Estimate for construction of an irrigation project, it can be seen that the project estimates do include a Cost: Benefit Analysis (CBA). Though, the Cost calculations are exhaustive, the benefit calculations are very brief and not substantiated. For instance the assumptions on land productivity (yield) before irrigation were not supported with any recorded evidence. Similarly, no justification is given for assumption relating to land productively after- irrigation, which is nearly 4 times the yield before irrigation. In such a scenario, the CBA often presents a financially viable project. Therefore, ***the State Government should draw up effective project appraisal tools, focusing especially on financial and economic returns from State investment on irrigation projects. The Department could create a Project Design & Management unit equipped with Project management tools to provide support, particularly by way of containing cost & time over runs, during the construction as well as the operation phases***.

3.9 In the Second report, the Commission had recommended that an Institutional mechanism for pre-investment appraisal of projects should be put in place and that all infrastructure projects above ₹ 10 crore should be subjected to detailed Social Cost: Benefit analysis. The Commission had also noted that there is a need for specific guidelines, templates, definitions suited to sectors. Based on the study of recommendations of Planning Commission, Technical Advisory Committee (Ministry of Water Resources) and templates used in projects in India, Annexure 3.d provides a suggested template for financial Cost: Benefit analysis, IRR (Internal Rate of return). In Financial Cost: Benefit Analysis, the benefits likely to be achieved from the projects are expressed, in monetary terms, against the costs to be incurred for the project. Further a Social Cost:Benefit Analysis could take into account the positive and negative impacts of the projects. For instance, some of the positive impacts of irrigation projects could include changes in asset ownership among farmers, increase in per capita net income (income less expenses), while negative impacts could include loss of land, sources of revenue and trade due to submergence, resettlement, rehabilitation, etc. ***The Commission recommends that the irrigation project reports should include techno-economic investment analysis explaining the rationale for the project with supporting documentation indicating the study of possible alternative options. The suggested***

Generic Reporting Template mentioned in the 2nd Report of the Commission includes factors to be considered for Economic Analysis, Option Analysis and Project Impact Analysis. The Commission recommends that the government may make use of the templates and that the Water Resources Department in co-ordination with related Departments i.e. the Agriculture Department, Energy, and Urban Development Department, should create a template for Economic Cost: Benefit analysis of the projects.

3.10 One of the key concerns in major and medium projects is delay in construction and cost escalation. Annexure 3.e provides details of on-going projects in Karnataka in Krishna, Cauvery and Godavari Basins. It could be seen that a large number of projects are nearing completion with more than 97 percent physical progress viz. Gandhorinala, Bennithora in the Krishna Basin; and Hemavathy Gorur, etc., in the Cauvery Basin. However, most of the project estimates have been frequently revised to increase the potential irrigated area or/and changes in the project design and/or due to the revision in project cost. In some of the projects original cost has been revised by 40 to 50 times. For instance the Hirehalla project commenced in 1977 has been revised by 43 times (4300%) of the original project cost; the Hemavathy Gorur project commenced in 1968 has under gone revision in the project costs by 107 times the original cost; Harangi Project commenced in 1964 had its project cost revised by about 50 times the original estimated cost.

3.11 Projects like the D.D. Urs Canal and Iggalur have cumulative financial progress of nearly 700 percent to 800 percent of the revised project cost. Further, in terms of percentage progress achieved as on March 2010, projects like the Upper Tunga, Amarja, Yagachi have cumulative physical achievement close to one third to one fourth of the cumulative financial achievement. The revisions are mostly due to problems in land acquisition, mid-course decisions to expand the potential irrigated area or contract management issues. While projects like Varahi, Singatlur, Hirehalla, etc., have unit cost (Revised Project Cost per unit of Ultimate irrigation potential created) of more than ₹ 3 lakh per hectare, projects like Hipparagi, Yagachi, Dudhganga, , Amarja, Lower Mullamari, Gandhorinala, Harinala have unit cost between ₹ 2 lakh per hectare to ₹ 3 lakh per hectare and there are about 11 projects including Karanja, Bennithora, Markendeya, Kamasamudra L.I.S, Huchannakoplu L.I.S, etc., which have unit cost between ₹ 1 lakh per hectare to ₹ 2 Lakh per hectare.

3.12 From the list of on-going irrigation projects in the State, (Annexure 3.e) it can be seen that out of a total of 42 projects covering 25 lakh hectares and involving cumulative cost of ₹ 26313 crore (revised project cost as on 31 March 2010), 23 projects have achieved a cumulative physical progress of more than 95 percent, 4 projects have achieved cumulative physical progress of 75 percent to 90 percent, 5 projects have achieved cumulative physical progress of 25 percent to 70

percent and 10 projects had achieved cumulative physical progress of less than 25 percent. Clearly, more than half of the projects have a cumulative physical progress of more than 95 percent. ***Incomplete projects which have reached 85% cumulative physical progress as on a pre- determined date should be declared as 'substantially complete'. Based on this, department should compile a 'Schedule of Balance works' for budgetary allocation. Such allocation could be made under a separate scheme with a sunset clause of 2 years. The Department should form a separate Project monitoring unit within the department to monitor the financial and physical completion of Schedule of Balance works. Hence, instead of repetitively working out the revised project costs separately for each of the projects, the Schedule of Balance works should be made use of for budgetary allocations.*** The Schedule of Balance works could provide details as shown below:

Project Name	Balance Irrigation potential to be created (Area in Hectares)	Balance Cost (₹ Crore)	List of pending works (with cost)	List of Challenges to be addressed for timely completion of the works	Additional cost (₹ Crore) in lieu of the challenges	Works wise Scheduled Time for completion (Not more than 2 years)

3.13 Annexure 3.g provides details regarding project selection methodology, procurement process, project implementation and reasons for delays for a sample of major and medium irrigation projects. The delays in execution of projects are largely attributed to inadequacy of funds, problems in land acquisition, forest and environmental clearances, rehabilitation and resettlement, contractual delays, etc., leading to time and cost overruns. Cost overruns also occur due to unexpected finding of hard rock whereas soft rock was assumed in the initial estimates.

3.14 Comptroller and Auditor General (C&AG) also observed that during the period March 2005 to April 2008, none of the projects was completed within the stipulated time (Audit Report - Commercial for 2007-08 and 2008-09). Reviewing the implementation of the irrigation projects in Karnataka under the Accelerated Irrigation Benefit Programme, the CAG had noted that the delays were mainly due to change in scope of work, change in estimates, non-synchronization of works and delay in grounding (taking up) of works, etc., which could have been avoided with better planning. Annexure 3.h provides the department-wise outstanding Inspection Reports[19] (IRs) wherein the water resources department accounted for nearly 50 percent of the total number of outstanding inspection reports for the State PSUs in Karnataka. Hence, ***it is necessary that the***

[19] Audit observations noticed during audit and not settled on the spot are communicated to the head of PSUs and concerned departments of State Government through Inspection reports. The heads of PSUs are required to furnish replies to the Inspection reports through respective heads of departments within a period of six weeks. Inspection reports issued up to March 2009 pertaining to 79 PSUs disclosed that 3,589 paragraphs relating to 919 Inspection reports remained outstanding at the end of September 2009; of these, 18 Inspection reports containing 167 paragraphs were pending due to non-receipt of even first replies. Department wise break-up of Inspection reports and audit observations outstanding as on 30 September 2009 is given in Annexure. (para 4.22, Audit Report (Commercial) for the year ended 31 March 2009)

Department not only ensures compliance of the inspection reports but also improves the systems to avoid repetition of the same mistakes. Central assistance given by way of loan to the State for completion of irrigation projects is under-utilised if projects are not completed within the stipulated time, with consequential financial implications. Apart from cost overruns, the delays also result in idling of assets and idle investments. In some instances, either the envisaged potential was not created despite spending considerable amounts of money, or the potential created could be not used due to non-completion of complementary works. ***Audit also reported irregularities such as allowing of undue benefit to contractors, unwarranted change in standard terms of contract, contractors being allowed to make modifications to quoted rates in violation of guidelines approved by Board of Directors of the Company, payment at rates higher than the approved Schedule of Rates, recording of false measurements on the basis of which excess payment to the extent of several crores of rupees was made to contractors,[20] non compliance with the KPWD Code[21] and misappropriation of funds***. ***Such actions by officials/contractors obviously attract penal measures. The Department needs to conduct prompt and speedy enquiries into all such cases, and award exemplary punishment to officers found guilty, as a demonstrable deterrent measure.***

3.15 Delays in implementation of irrigation projects result not only in direct losses due to cost overruns, but also opportunities lost for timely productive utilisation of the planned ***There is a need for the KBJNL, KNNL and the Water Resources Department to adopt professional project management approach for executing irrigation projects in the State. Similarly, the Land Consent award followed by KBJNL in the Upper Krishna Projects should be followed for mitigating risks associated with delays caused due to land acquisition. In the vexed matter of encountering increased occurrence of hard-rock during execution of project as compared to***

[20] As could be seen in the C&AG Audit report (Commercial) for the year ended 31 March 2009 : For the Bellary Nala Irrigation Project of ₹ 138 crore executed by Engineering Projects (India) Limited (contractor), based on a complaint (July 2008), the Joint Secretary to Government of Karnataka, Water Resources Department, directed (September 2008) the Superintendent Engineer (SE) of the company to conduct an investigation about financial impropriety contained in the complaint and report to the Government. The SE observed (September 2008) and confirmed the irregularities such as subcontracting the entire work, recording false measurements, making payments on such measurements. The Vigilance cell of the Water resources department reported (December 2008) and pegged misappropriation of public funds at ₹ 21.84 crore of which ₹ 14.64 crore was recovered from the contractor. Added scrutiny of the work also revealed violation of contractual terms viz. Interest on excess payment not raised on the contractor, Incorrect calculation of base rates for cement, Non stacking of hard rock as required under the agreement, resulting in excess payment of ₹ 3.28 crore.

[21] Non compliance to KPWD codal provisions was observed with regard to (i) recording of only tape measurements instead of recording initial and final levels reached (ii) failures to mention date and signatures on Measurement books (iii) running bill references not recorded. The excess payment worked out to ₹ 22.65 crore. The Vigilance report identified involvement of 25 engineers and 20 accounts staff. Framing of charge sheets on officials is yet to be finalised (June 2009); Also as per circular instructions of the Company, the works under progress should be inspected by SE atleast once in a fortnight and by the CE once in a month. The Audit observed that between August 2005 to September 2008, SE has visited the project four times and the CE had visited the project eight times.

initial estimates, it is recommended that a) the contract terms may be so designed that whenever hard rock found during project execution is more than 10 percent of the initial estimates, the extent of hard rock should be measured and validated by a third party expert team; and b) while preparing estimates, latest technology of geological imagery should be utilized in order to correctly assess the hard rock. Several instances of irregularities noted by audit and poor compliance with audit observations underscore the need for better supervision and oversight. KBJNL and KNNL should strengthen the internal audit in their companies so that the scope for misuse of funds in executing irrigation projects is minimized.

3.16 The outcome of irrigation projects is creation of assets, providing food security by additional production of food crops, increased production of non food crops, generation of employment, etc. The State has taken initiatives for improving expertise for water usage, resource management and policy formulation. The State is in the process of reviving and incentivizing the Water User' Associations, but a gap still exists between potential created and actual utilisation. The details of potential created and area notified for KBJNL are at Annexure 3.i from which it can be seen that of 6,07,810 hectares of potential created, the notified area (for Rabi) for 2010 is 5,66,404 hectares only. For the state as a whole, the gap between potential crated and actual utilization is about 20 percent.

3.17 In an evaluation study[22] of the Command Area Development Programmes in Malaprabha project to understand difference between pre-irrigation and post irrigation data, based on primary research and questionnaires administered to the farmers benefitted by the irrigation project and the responses from farmers, the study has observed that there is an increase in cropped area of about 71 percent. Increase in productivity to the extent of 66 percent was registered for ground nut, increase of 52 percent was registered for Maize, increase of 29 percent was registered for Jowar, increase of 155 percent was observed for cotton. With regard to value of produce, an increase of 84 percent was registered for groundnut while value of produce of Jower crop was 62 percent higher. The study report thus observed improvement in production, productivity, increase in number of farm buildings and cattle sheds owned by the farmers. Further, similar studies undertaken by TECSOK (Technical Consultancy Services Organisation of Karnataka) in 2002 and 2007 for KBJNL in Indi and Jewargi Taluks also report improvement in the economic situation of the farmers in the irrigated area. The Study by TECSOK for people benefitting from Indi Branch Canal has also observed an increase of economic activity in the area as noted from an increase in the membership of co-operative societies, ownership of two-wheelers, number of telephones, Cattle livestock, number of factories, employment, etc. In the light of the observations made by the reports, there is sufficient room to implement collection of rational User Charges for Irrigation.

[22] Study done by CC Patel and Associates for Ministry of Water Resources, GOI September 1995

User Charges

3.18 Already some states are collecting water user charges and revising it periodically. In Maharashtra, during the year 2007-08, as against a revenue assessed of ₹ 674 crore, the revenue realized was ₹ 627 crore while in Karnataka, as against revenue assessed of ₹ 69 crore, revenue realized was only ₹ 20 crore. Annexure 3.k provides comparison of Water Rates for Irrigation of a few selected states in India. The water rates for irrigation in Karnataka are lower than Maharashtra and Andhra Pradesh. For instance, while the water user charge for the Sugarcane crop in Maharashtra is ₹ 6297 per hectare, in Karnataka, the water user charge for the Sugarcane crop is ₹ 988 per hectare. This makes out a case that Karnataka is to put in place its water rates so as to recover some cost of operations as being done in neighbouring states.

3.19 Similarly, in the context of non agricultural use of water, the user charges in Karnataka for Domestic and Industrial use are also low as compared to Maharashtra, Andhra Pradesh. Annexure 3.k indicates that Maharashtra was charging as high as ₹ 72 per Kilo litre For industrial water whereas Karnataka was charging ₹ 0.11 per Kilo litre. [23] '*The 'total approach' reforms process for Water User Charges followed in Maharashtra involved policy reforms, technological and managerial interventions including capacity building of personnel and institutions. Also public awareness campaigns to promote participation of users were undertaken. The successful implementation of the reforms has resulted in improvement in performance of irrigation projects. The reforms have also improved financial performance of irrigation project, with O&M expenses being recovered through water charges.*[24] The Commission considers that the Maharashtra approach for reforms is reasonably instructive for increasing efficiency of expenditure in irrigation projects.

3.20 Collection of water rate to match O&M expenditure is a policy guideline prescribed by the Ministry of Water Resources, Government of India. In Karnataka, for the year 2009-10, against a demand of ₹ 85 crore raised by the Water Resource Department for water use, the collection was ₹ 19.6 crore only. Generally, the collections from water users are around 15 percent of the O&M expenditure leading to insufficient maintenance of the existing irrigation structures and thereby putting pressure on budgetary support every year. Extracts - State Water Policy are at Annexure 3.l. The low recovery of revenue has been recognized in the State Water Policy released in 2002. The Government of Karnataka has constituted the Karnataka Water Resources Authority vide its GO No. WRD 85 MBI 2008, Bangalore dated 08.09.2008. The functioning of the Water Resources Authority, interalia, includes the mandate to implement the Water Policy. In their meeting held in December 2008 and in subsequent meetings, the Sub-Committees have recommended various measures. However, the issues relating to overarching policy decision of

[23] Rates for Industrial use in Karnataka are converted into ₹ /KL from ₹ /cft; (1 cubic foot = 28.316847 litres);

[24] Reforms initiative in Water resources sector in Maharashtra, S.V Sodal, Secretary, Maharashtra Water Resources Regulatory Authority, 2007.

sustainable use of water, conservation of water, establishment of a Water Library are yet to be addressed. The Karnataka Irrigation (Levy of Water rates) Rules framed by Government of Karnataka under Notification No. WRD16 NPC 99(P) dated 9th October 2002 provide for levy of water rates in full for the fourth and subsequent years after commencement of supply of water made available for irrigation. The rules also allow for levying of water rate at fifty percent in cases where water is drawn from an irrigation source belonging to the Government or Nigam for industrial use and returned unpolluted. Given that an effective system of user charges could reduce burden on the budgetary allocation. ***The Commission emphasizes the importance of creating a sense of ownership of irrigation assets amongst the water users in the areas of the completed projects. In case of incomplete projects or for projects in progress, a system of collecting user charges after a period of say, 2 years of release of water, by the irrigation Authorities should be made mandatory.***

3.20A ***Further, initiatives for collecting water charges for power generation have to be enlarged to cover all projects including micro/mini/small hydel power projects which have completed five years life. The Government Order granting open-ended price concessions to micro/mini/small hydel power projects needs to be amended to introduce a sunset clause. Similarly, ULBs wherever, they draw water from Government Irrigation sources should pay water charges as provided by the Karnataka Irrigation (Levy of Water rates) Rules, 2002. The ULBs can in turn, collect appropriate water charges from their users.***

3.21 The Thirteenth Finance Commission expressed concerns and made recommendations on maintenance of irrigation projects and collection of water charges as shown in Box 1 below:

Box 1 : Thirteenth Finance Commission (Irrigation)

para 4.39 : 'Subsidies to the irrigation sector are mostly implicit in nature, arising from gross under-recovery of user charges. The distressing fact is that receipts from the sector do not even cover the expenditure on operation and maintenance of irrigation projects. In 2006-07, revenue receipts of all states from the irrigation sector aggregated to ₹ 1666 crore, accounting for only 16 per cent of the non-plan revenue expenditure of states on irrigation. The main problems of the sector are very low water rates, poor collection efficiency, high establishment cost and lack of maintenance of irrigation projects.'

para 7.82 : Given the need for adequate provision for maintenance of irrigation schemes, the Thirteenth Finance Commission has adopted the norm of ₹ 1175 per hectare for the utilised potential and ₹ 588 per hectare for the unutilised potential for major and medium irrigation schemes respectively, in the base year, implying a step-up of 52 per cent from the norms adopted by FC-XII. After adjustment for inflation, with an annual growth of 5 per cent thereafter, these would reach the level of ₹ 1500 per hectare for utilized and ₹ 750 per hectare for unutilised potential in the terminal year of our award period.

The Thirteenth Finance Commission has recommended that the Water Regulatory Authority be set up before 2012 march and has made it a condition precedent for release of Grant-in-Aid for the water sector management. During the period 2010-15, Karnataka's entitlement for the grants is ₹ 128 crore. [25] This recommendation has now been followed by an advice from Ministry of Finance, Government of India, vide their letter dated 25th April 2011. [26] This advice makes it explicit that these grants be used for non salary maintenance expenses of Major, Medium and Minor irrigation schemes. The Communication from the Ministry of Finance stipulates that "apart from setting up WRAs, the eligibility of States to receive the grant will depend on their effecting recovery of water charges in accordance with the recovery rates specified by FC- XIII. Where a State's WRA specifies recovery rates different from FC-XIII's rates, the WRA mandated rates will apply". The recovery rate laid down by the 13th Finance Commission for Karnataka is 24% of Non-Plan Revenue expenditure on maintenance of Major, Medium & Minor Irrigation schemes for the year 2012-13 to be increased to 39% by 2014-15. This will imply that water charges recovery should go up from the existing level (₹ 19.64 crore) to (approx) ₹ 100 crore in 2012-13 and (approx) ₹ 186 crore in 2014-15. It may also be noted that, the KFRA, 2002, section 4 (1) h mandates that the State should 'pursue non-tax revenue policies with due regard to cost recovery and equity'.

3.22 ***The Water*** **Resources** ***Department in co-ordination with the Finance Department should evolve an implementation strategy for recovery of water charges from users in accordance with the recovery rates as suggested by the 13th Finance Commission or as mandated by the Water Regulatory Authority.*** The policy of water charges should aim at the following:

a. discourage excessive use of water;
b. recover cost of supplying water to various users like farmers, industries, and domestic consumers;
c. get a share of extra revenue earned by the farmer due to increased yield as well as from the industrial units who use water for processing and as a main raw material;
d. encourage recycling of waste water particularly from industrial units;

It needs to be mentioned that the model created by Karnataka Community Based Tank Management Project (KCBTMP) offers required organization mechanism for community based participation in irrigation management. Learning from these projects can be internalized in all other irrigation projects. To prevent diversion of water from irrigation project for non-irrigation use without cost recovery.

[25] Thirteenth Finance Commission Report, Volume II, Annexure 12.5
[26] http://finmin.nic.in/TFC/Guidelines_Water_Sector_Management.pdf

Command Area Development Authorities (CADAs)

3.23 The State has six Command Area Development Authorities. Annexure 3.j provides details regarding allocation and expenditure for CADAs. For the year 2009-10, the Irrigation Project Zone, Gulbarga received the highest allocation of ₹ 1477 lakh (15 percent). The budgetary allocation between the six CADAs or the expenditure does not reflect the scope and extent of work required for the CADAs. Also while the performance budget mentions the budget allocation and the expenditure for the respective CADAs, it does not record the physical progress achieved in the CADAs. The objectives of CADAs for Irrigation management are multi-disciplinary in nature and include comprehensive development of Command Area, ensuring supply of inputs and services to farmers, maintenance of the field channels, organizing credit facilities to the farmers and setting up agricultural demonstration to promote extension activities for better utilization of the irrigation potential created. ***The Water Resources department should orient the CADAs to ensure community participation in irrigation management, and to extend structured training and education to the Water User Associations and farmers in their respective command areas in matters such as the efficient use of available water, practice of effective water harvesting techniques, and adoption of drip and sprinkler methods of irrigation so as to maintain increased productivity and soil fertility in the Command area.***

3.23A The CADAs should monitor the relevant parameters and communicate the same every month to both the Water Resources Department and the Agriculture Departments. Committed and experienced professionals should be posted in the CADAs with fixed terms of atleast 3 years each. The CADA staff should be given regular orientation, training and technology support to enhance their competence.

Water Resources Department (Minor Irrigation)

3.24 The Minor Irrigation Department looks after the planning, designing investigation, construction and maintenance of Minor Irrigation projects in the state. The Department is headed by the Secretary and has two zones headed by Chief Engineers. The South Zone at Bangalore has jurisdiction of Minor Irrigation in 17 districts and the North Zone at Bijapur has jurisdiction of the Minor Irrigation works in 12 Districts as shown in the Table 7.

Table 7: Minor Irrigation Zones

Minor Irrigation South Zone, Bangalore	Minor Irrigation North Zone, Bijapur
1. Bangalore (Urban)	1. Bijapur
2. Bangalore (Rural)	2. Bagalkot
3. Ramanagara	3. Belgaum
4. Kolar	4. Uttara Kannada
5. Chikkaballapura	5. Dharwad
6. Tumkur	6. Gadag
7. Chitradurga	7. Haveri
8. Davangere	8. Bidar
9. Shimoga	9. Gulbarga
10. Mysore	10. Raichur
11. Chamarajanagar	11. Koppal
12. Mandya	12. Bellary
13. Hassan	
14. Chikkamagalur	
15. Dakshina Kannada	
16. Udupi	
17. Kodagu	

Each of the two zones has two circles under them with each circle headed by a Superintendent Engineer. Further, the Minor Irrigation Zone (South) has 8 divisions and 22 sub divisions under it and the Minor Irrigation Zone (North) has 8 divisions and 27 sub divisions under it. Each zone also has a Quality Control Division under it. The Quality Control Division, Bangalore has two Quality Control sub divisions and the Quality Control Division, Dharwad has four Quality control sub divisions.

3.25 The Minor Irrigation Department implements Central Sector Schemes viz. Prime Minister's Special Package Programme in distressed districts, World Bank assisted Tank Management Projects, NABARD assisted projects, etc., and State Plan Schemes like, Construction of Tanks, Barrages, pick-ups, bandharas, Lift Irrigation Schemes, etc. The grants and expenditure for the year 2008-09 is as shown in Table 8 below;

Table 8: Grant and Expenditure for Minor Irrigation 2008-09

A.	PLAN	Grant (₹ Lakhs)	Expenditure (₹ Lakhs)	Expenditure (percent)
1.	NABARD Works	20700	15179	73
2.	Major Works	17946	17784	99
3.	Special Component Programmes	1539	1328	86
4.	Tribal Sub Plan	660	627	95
5.	National Project for Repairs, Renovation and Restoration of Water Bodies	373	242	65
6.	Jala Samvardhane Yojane Sangha	5000	2765	55
7.	Survey, MI Statistical Cell, Administrative Expenses	2647	2394	90
8.	Flood Control Works	2162	1983	92
	Total Plan	**51028**	**42301**	**83**
B.	Non Plan	8144	7551	93
	Total Plan & Non Plan	**59172**	**49852**	**84**

Source : Annual report, 2008-09, Minor Irrigation Department, Government of Karnataka

3.26 Works of the Minor Irrigation Department include tanks, pickups, bandharas, barrages and Lift Irrigation Schemes (LIS). The minor irrigation projects have gained vital importance as major irrigation projects cannot be speedily implemented and cannot be constructed at all locations. Of 10 lakh hectares potential irrigation to be created from minor irrigation projects, 9.8 lakh hectares has been created. There are 3437 tanks with the department of Minor Irrigation[27]. Under the World Bank assisted project by JSYS (Jala Samvardhane Yojana Sangha), project interventions include developing and strengthening community based approach to managing selected Tank systems with a project cost of ₹ 508.63 crore to serve 72,000 ha of command area in Phase-I (2002-2012) through 2005 Tanks, while Phase –II (2009-2012) with an amount of ₹ 307 crore covers 1224 tanks. The State Project Unit is responsible for project implementation and monitoring. The SPU is supported by Sections separately for Technical, Financial Administration, N.G.O, Agriculture, Environment, Social, Marketing and Monitoring & Learning Communication. Down below there are 9 District Project Units (DPUs) headed by District Project Co-ordinators which have been set up in 10 districts (Bellary and Koppal have one DPU). About 30-40 tanks are formed into a cluster supported by one Cluster Facilitation Team (CFT). As at end March 2009, under Phase-I, work relating to 1300 Minor Irrigation tanks have been completed, of which 452 tanks have been handed over to the Tank user groups. ***The Karnataka Community Based Tank Management Project (KCBTMP) demonstrates the feasibility of forming Tank users groups for managing the irrigation assets, and recovering of water charges for maintenance. This model needs to be sustained in order to continuously draw benefit from Tanks without burden on budgetary resources. Further, the model can be suitably upscaled to involve water users in all other irrigation projects effectively. If necessary the officers and staff involved in KCBTMP, which is a kind of social engineering/enterprise development activity, may be deployed for up-scaling operations in the medium irrigation project areas or under CADAs.***

Mines and Geology Department

3.27 The Ground water wing is functioning as an integral part of the Department of Mines and Geology and implements field investigations/programmes. The Chief Geophysicist, Chief Drilling Engineer, Deputy Director (GW and R&D), Chief chemist, senior geologists are implementing the programmes. The supervision of the field programme is being done by the Joint Director (south), Mysore and Joint Director (North), Bellary at district level in their jurisdictions. The Ground water programmes comprises State Component and Zilla Panchayat component. The budget allocation

[27] Separately, a*bout 20,000 Tanks (minor irrigation works) with an atchkat of less than 40 hectares are under the control of the RDPR department.*

and the physical progress achieved in different programmes are shown in Table 9 below.

Table 9: Budget, expenditure and physical progress for the year 2008-09, Ground water

Programme	Budget (2008-09) in ₹ Lakhs	Expenditure (₹ Lakhs)	Expenditure (percent)	Physical progress
Training (Direction & Administration)	6	4	67	8 public awareness programmes organised to create awareness among public regarding conservation and proper utilisation of groundwater and rainwater.
Groundwater Development by Remote Sensing Technique	22	18	79	'Ground truth verification survey' with help of satellite imageries, Area of 502 sq. kms covered
Survey and Strengthening of Surface water and Ground water	217	190	87	34 artificial recharge structures i.e check dams constructed, 209 pumping equipment extracted from borewells, 1682 yield tests conducted.
National Hydrology Project Assessment and Development of Groundwater	226	60	26	400 Digital water level recorders installed, 4800 water levels recorded
	471	271	58	

Source : Annual report, 2008-09, Minor Irrigation Department, Karnataka

3.28 In Karnataka, the net annual ground water availability as of March, 2009 is estimated to be 148 BCM (Billion Cubic metres) as per State Mines and Geology report of November, 2010. In the dry taluks of North and South interior Karnataka the exploitation of ground water is higher in comparison to the coastal areas, Malnad and irrigated command areas. There is a deficiency of water for drinking, agricultural and industrial use in dry taluks of North and South interior Karnataka.

3.29 The existing groundwater draft for irrigation is 9.00 lakh Hectare Meters (ham) out of the net annual groundwater availability of 14.81 lakh ham. Taking into consideration the other uses of groundwater, the net groundwater availability for future irrigation development is about 6.18 lakh ham. The existing stage of development of groundwater in the state is about 68.1%.

Table 10: Ground water resources of Karnataka as of 31-03-2009

Ground Water resources	Resources
Net annual groundwater availability (ham)	14.81
Existing ground water draft for irrigation (ham)	9.00
Existing groundwater draft for domestic and industrial water supply (ham)	0.99
Existing ground water draft for all uses (ham)	10.00
Allocation for domestic and industrial use for next 25 years (ham)	1.26
Net groundwater availability for future irrigation development (ham)	6.18
Stage of ground water development (Existing ground water draft/Net annual ground water availability)	68.10%

Source: Department of Mines and Geology

3.30 As stated by the Department of Mines and Geology, there has been a decline in the Net annual groundwater availability from 16.3 lakh ham in 1992 to 14.81 lakh ham in 2009. The reasons cited for this fall have been the fast pace of urbanization and the changing pattern of land use. As per the "Report on Dynamic Ground Water Resources of Karnataka as on March 2009", published by Mines and Geology Department, Karnataka during November 2010, out of 175 taluks, water resources in 35 taluks are over exploited (3 taluks are under this category) 10 taluks are under semi-critical category, 70 taluks are safe category and balance 58 taluks are under mixed category.

Table 11: Status of Ground water in Taluks, Karnataka as of 31-03-2009

Wise Category	Apportioned from watershed map as on	
	Mar-04	Mar-09
Over Exploited Taluks	22	35
Critical Taluks	Nil	3
Semi-Critical Taluks	Nil	10
Safe	51	70
Mixed	102	58
Total	175	176

Note : Over Exploited : Discharge is greater than recharge of water, Critical Taluks : Discharge is between 90-100% of recharge , Semi critical : Discharge is70-90 % recharge ; Safe : Discharge is less than 70% of recharge; Source : Annexure IIA, Dynamic Ground Water resources of Karnataka – March 2009, Department of Mines and Geology, Government of Karnataka

Water Regulatory Authority (WRA)

3.31 The 13th FC in its recommendations relating to release of water sector grants from Center has made it conditional to establishment of a Water Regulatory Authority in the State. While states like Andhra Pradesh and Maharashtra have constituted a Water Regulatory Authority, Karnataka is yet to constitute a State Water Regulatory Authority. ***The State Government should expedite the constitution of a State Water Regulatory Authority which could function as a regulator for water use in the State and also review the optimum use of water in the state.*** This Authority has to (a) fix and regulate the water tariff system and charges for surface and sub-surface water used for domestic, agriculture, industrial and other purposes; (b) determine and regulate the distribution of entitlement for various categories of water –users; (c) periodically review and monitor the water sector costs and revenues.

3.32 ***In anticipation of the constitution of the Water Regulatory Authority, the Water Resources Department, Nigams and CADAs should be encouraged to maintain more accurate and credible database required to formulate proper water rates for water use. The Water Resources Department needs to establish an improved mechanism for regular and efficient maintenance of Irrigation assets.*** The Karnataka Fiscal Responsibility Act, 2002[28] under section

[28] KFRA, 2002 4 (1) (k) - ensure that physical assets of the Government are properly maintained

4 (1) (k) and 4 (1) (m) mandates that the Government maintain assets and that they be put to best possible use. Similarly, the Nigams and Societies which are covered under the KLFAFRA[29] are mandated to maintain updated asset registers. ***The Corporations should be encouraged to create data-base for costs and revenue, income and expenditure to aid the Regulatory Authority, effectively. Systematic maintenance of asset registers, and a credible data-base relating to the assets, O & M cost, recovery rates, etc., can form the basis for fixing water rates and a reliable system to collect the same. The Water Resources Department should also formulate a training plan for its personnel to use the data.***

Training and Capacity Building

3.33 The observations, made in the paragraphs above, with regard to Irrigation projects in the State indicate inadequacy of capacity within government in project planning, monitoring and sound project implementation institutions. ***Better co-ordination between various agencies in the project works should be ensured to reduce the changes in scope, design and delays in project implementation. Further, regular and prompt record and document management are pre-requisites for an efficient project management and completion and to ensure better return to the state for investments made in these projects. The Water resources department needs to co-ordinate regular training of the staff on the procedures, documentation and record-keeping to be maintained for better project management.***

3.34 The strategies recommended by the Working group on Water Resources set up by Ministry of Water Resources in Government of India, are summarized in Annexure 3.m. ***The strategies for improving irrigation efficiency and measures for efficient irrigation water delivery are very apt for Karnataka. These include evolving a basin efficiency concept which integrates all surface water and ground water uses as well as reuse and recirculation, conjunctive use of water, selective lining of canals, preparation of water budget, preparation of O&M budget in consultation with farmers, study of all schemes which are more than 25 years old for structural safety and performance.***

KFRA, 4 (1) (m) - ensure that Government uses resources in ways that give best value for money; and also ensure that public assets are put to best possible use
KFRA, 4 (1) (h) - pursue non-tax revenue policies with due regard to cost recovery and equity;
[29] Karnataka Local Fund Authorities Fiscal Responsibility Act, 2003.

Chapter 4

Urban Development Department

4.1 The world is urbanizing rapidly. It is estimated that by 2050, three quarters of the global population of nine billion will be living in cities. In developing countries like India, economic growth is inevitably accompanied by a continuous process of urbanization, and Karnataka is no exception. Karnataka is the fourth most urbanized of the major States of India. The State's urban population is projected to grow from 1.79 crore in 2001 to 3.51 crore in 2025, (Annexure 4.a) i.e. from 34 % to 43% of the total State population. This involves profound social, economic, environmental and cultural transformation and, on a practical plane, creates extreme pressure on the resources and whole range of urban services such as drinking water supply, sanitation systems, affordable housing, transport facilities, public safety, health services and education. There is opportunity, however, for policy makers to take advantage of the growing industrial and commercial activities to realise increased tax revenues that can be used not only to upgrade urban services, but also for funding other State programmes as well.

Urban Development in Karnataka

4.2 As per the Performance Budget of the Urban Development Department, Government of Karnataka, for the year 2010-11, the number of ULBs is 218 (other than Bangalore). However, the number of towns (urban habitations) in Karnataka, as per Census 2001 was 270. As per Census 2011, there are 220 statutory towns, 127 non statutory towns (census towns), 22 urban agglomerations in Karnataka. (provisional population totals, paper 1 of 2011, Census of India, 2011, Karnataka). While the changes in the number of towns as per the census enumeration are partly attributable to the changes in the census definition of urban areas, the number of urban local bodies under the Karnataka Municipal Corporations Act, 1976 and the Karnataka Municipalities Act,1964 depends upon the relevant notification under these two Acts. The variation between the number of Urban Areas as per Census figures and the number of ULBs as per State Laws, points to the need for broadening the coverage of the State's Urban development policies so that the infrastructural needs e.g. drinking water, sanitation, Roads, Transport etc of peripheral habitations emerging urban areas (census towns) are planned in an integrated manner along with the existing statutory cities and towns.

4.3 The spread of urbanisation has been uneven in the State. More than 65% of the States' urban population inhabit urban centres along the major transport corridors, viz. the Bangalore-Belgaum, Mysore- Kolar and Mangalore- Karwar roads. In fact, this growth is an anti-thesis of the objective of containing ribbon growth along the highways at enunciated in legislative objective enunciated in Karnataka State Highways Act, 1964. This only indicates that commensurate action to implement legislative objectives was either weak or was not effective.

4.4 The speed of urbanisation has outpaced the State's ability to develop the required infrastructure for growing needs of towns and cities. There is substantial deficit of infrastructure in virtually all the key areas of urban services, viz. drinking water supply, domestic sanitation, sewerage treatment systems, solid waste collection and management, transport (intra-city and inter-city), housing including commercial space, etc.

4.5 Of these, the most pressing areas of concern is providing regular supply of safe drinking water. Large parts of the State are dry and rainfed, without access to adequate water sources throughout the year. As per 2001 census, 78.4% of urban water supply is from taps (water supply systems from rivers and reservoirs, 7.5% from tubewells, and the rest from other sources including open wells. With increased drilling of borewells for drinking and irrigation purposes, water table is falling rapidly. Further, high concentration of nitrate, fluoride and arsenic is observed in the ground water in several districts. In this direction, a survey commissioned by the High Power Committee (HPC) for Redressal of Regional Imbalance 2002 also indicates that the quality of drinking water in most urban areas is affected by contamination of ground and surface water during transmission and distribution. Contamination of surface water also occurs at places where rivers flow alongside industrialized/ mining areas. Thus, there are constraints on the quantity as well as the quality on water. It is difficult, therefore for the State to supply water at normative rate of 70, 100 and 135 lpcd (litres per capita per day) respectively in towns, city municipal council and city corporation areas.

4.6 In the context of Bangalore, it is noted that the Cauvery water Disputes Tribunal (2007) has considered a water requirement of 8.70 TMC for urban population in the Cauvery Basin, viz. Bangalore, Mysore, Mandya, Ramanagara, Tumkur, etc. In its award, the Tribunal has allowed water requirement at 135 litres per capita per day (lpcd) for twenty five percent of the population in the urban areas and 100 lpcd for 75 percent of the urban population. [30]The weighted average of urban water requirements for domestic consumption works out to 109 lpcd. (i.e 25% x 135 + 75% x 70). In respect of Bangalore, for area falling within the basin, water @ 150 lpcd has been provided. Presently,[31] the river Cauvery provides about 80 percent of all the water supplied by BWSSB and the average aggregate supply from Cauvery is 810 million litres per day (MLD) of treated water from the Cauvery Water Supply Scheme – Stage I, II, III. With the present population[32] of Bangalore at 95.88 lakhs, a water supply of 810 MLD translates to 85 lpcd (810

[30] Para 15, Chapter 4, Volume V, Domestic and Industrial water requirement of Karnataka and Tamil Nadu from Cauvery Waters, Report of Cauvery Water Disputes Tribunal, with the decision; New Delhi, 2007.

[31] Website of BWSSB, http://www.bwssb.org./help_faq.html updated as on Saturday, May 07, 2011, accessed on 07th May 2011.

[32] Census of India, 2011 – provisional population totals for Karnataka.

MLD / 9.588 million). In other words, there is a short fall of nearly 43 percent (65 lpcd) [33] of daily requirement which has to tapped from local water bodies and ground water for Bangalore city in terms of domestic water supply requirements. In fact, the state water policy prepared as early as 2002 also recognizes that there is a need for 135 lpcd in City Corporation areas.

Table 12: Average Domestic Water consumption in Indian Cities (typical) [34]

S.No.	Use	Consumption in litres/day/person*
1	Drinking	5 Litres
2	Cooking	5 Litres
3	Bathing (incl. ablution)	55 Litres
4	Washing clothes	20 Litres
5	Washing of utensils	10 Litres
6	Cleaning of houses	10 Litres
7	Flushing of latrines	30 Litres
	Total for urban areas	***135 Litres****
8	Extra for large/metro cities for more institutional needs	15 Litres
	Total for Metro cities	**150 Litres**
** Water Supply Engineering by S.K.Garg, Khanna Publishers*		

As can be seen from Figure 2, 150 lpcd would cover domestic water needs in metro cities. The Tribunal has taken industrial water requirement at 3.82 TMC in the Cauvery basin. Considering the costs of transporting such volume of water, the investment decisions have to take into consideration the recovery of water charges from the users with regard to their business needs. The requirement of water for industrial units as also, high water intensive construction activities, if taken into account, the water requirements in the Bangalore would be very high. As per census 2001, Bangalore had a population of 65.37 lakhs. As against this, in 2011, provisional population is at 95.88 lakhs. BWSSB has implemented the Cauvery Stage IV phase I which would augment the water supply by about 270 million litres per day. Also Cauvery Stage IV phase II is expected to further augment the water supply by about 510 MLD. Taking into consideration Cauvery Stage IV phase I and II, the supply would be augmented to about 1590 MLD (810+270+510) which, @ 150 lpcd, would be able to cater to the domestic consumption of 10.6 million population. Thus, for providing water on a sustainable basis, the government entities may have to incur substantial capital expenditure and also maintain the infrastructure created in this direction. Therefore the Government has to put in place a policy for effectively recovering some of the costs of transporting water from the source to the point of consumption.

4.7 Equally pressing concerns, if not more, relates to Solid waste management and Sanitation because this raises concerns of public health issues. Systems for drainage of waste water, sewage disposal and solid waste collection and treatment/disposal are woefully inadequate in most urban

[33] 150 lpcd minus 85 lpcd = 65 lpcd.

[34] http://www.indiawaterportal.org accessed on 07th May 2011.

areas. In many places including the Bangalore urban region, a number of mushrooming new residential and commercial complexes have no connection to the City sewage lines, and discharge waste into rivers, valleys and water bodies. About 3000 metric tons of solid waste per day is generated in Bangalore, and another estimated 4300 tons in the other urban areas of the State. About 23 % of the waste generated does not get collected, and the waste disposal itself is carried out in an unscientific manner, mainly in open dumping yards.

4.8 Details regarding Urban road length, length of surfaced urban roads, urban population and urban area for a few selected states in India are at Annexure 4.b. As on 31 March 2008, the total length of urban roads in Karnataka was 24,070 kms and total length of surfaced urban roads (Black Top, Cement Concrete, Water Bound Macadam) was 15,418 kms. The road density (Total urban road length/total urban area) was highest (4.6) in Karnataka among the states compared. Also, among the states compared, with the exception of Kerala (1.6), Karnataka had the highest (1.3) road length per '000 population. [35] However, among the states compared, the total length of surfaced urban roads as a percentage of total urban roads was the lowest (64 percent) in Karnataka while the other states viz. Maharashtra, Gujarat, Tamil Nadu, Andhra Pradesh and Kerala had an average of 79 percent of surfaced urban roads. This variation indicates the need for investing in surfacing the urban roads in Karnataka in such a way that in a reasonable time, most urban roads are surfaced to ensure efficient and smooth mobility to urban road users.

4.9 With infrastructure and services failing to keep pace with the needs of the rapidly growing urban population, the quality of urban life would be jeopardised especially for the urban poor who are particularly affected by inadequate, and low quality housing. This assumes greater significance in view of the fact that the urban poverty ratio of 32.6% in Karnataka is much higher than the other three Southern States, and than the all India average (25.7%) as well.

Table 13:Urban Poverty levels and Monthly Per Capita Expenditure (MPCE) of Select states

State	Urban Poverty Level (percent)	Urban MPCE (₹)
Gujarat	13	1206
Kerala	20.2	1354
Tamil Nadu	22.2	1155
India	25.7	1105
Andhra Pradesh	28	1081
Maharashtra	32.2	1228
Karnataka	32.6	1138

Source : Urban Development Policy for Karnataka (Draft), Urban Development Department, Government of Karnataka, November 2009, Sachar Committee report, 2006.

[35] Since population are for 2001, Length of roads are as on 31 March 2008, there will be some variation in road length per population

4.10 Similarly, gaps exist between requirement and facilities relating to transport, housing, [36] public safety, etc. In the context of housing, since the profile of the urban residents, particularly in Bangalore, change due to changes in nature and duration of employment, such kind of people, among others, would need houses/apartments on rent or lease. Therefore there is a need to revisit the existing legal framework governing landlord tenant relationship to ensure a win-win situation for both. Such kind of flexibility would have the advantage of increasing supply of good quality rental housing through increased non corporate private investments.

Challenges for Urban Infrastructure Development in Karnataka

4.11 There are 213 ULBs in the State, excluding 5 Notified Area Committees. According to a study carried out by KUIDFC, over the five year period 2010-15, the total financial requirement of the State (excluding Bangalore) for providing normative standards of water supply, underground drainage, solid waste management, sewerage and drainage to all the ULBs is estimated to be ₹ 30,760 crore (2008-09 prices), with another ₹ 6037 crore required for operation and maintenance of the assets created. However, there is a huge gap between the amount required for providing basic services and resources available to the ULBs. The annual revenue generation from these ULBs is about ₹ 240 crore, mainly through property tax and advertisement tax. Additional financial support is received from the State Finance Commission, from Government of India (through Centrally Sponsored Schemes) and from the Externally Aided Projects. Available resources, assuming current level continues in future, i.e. at the rate of ₹ 2500 crore every year for 5 years, would be ₹ 12500 crore. Thus there will be a resource gap of ₹18260 crore as per current estimate excluding the operation and maintenance cost. In addition, the requirement of Bangalore over the next five years as per the study carried out by M/s CRISIL is ₹27, 825 crore for the above services, with an additional requirement of ₹ 25,299 crores for transport and traffic.

4.12 The ULBs do not have any liability, surplus land may account for 5 to 7 per cent of the assets of the ULBs. In this regard, the ULBs need to be supported by the State Government in creating an asset database through institutions like the Municipal Reforms Cell. Such database should contain ULB wise inventory of taxable properties, properties that are exempted from taxes, properties that are leased out by ULBs, properties that are owned by ULBs and used for self occupation. Such an asset base can be leveraged for raising resources including, through debt instruments by linking to future revenue flows. Generally the supply of land in urban areas is limited and the pressure for alternative uses continues to grow. In order to contain such

[36] As per the Karnataka Housing and Habitat Policy-2009, (Draft) compiled by Housing Department, Bangalore, Karnataka is the eighth largest state to face housing problem with 4.38 per cent share in the total housing shortage of the country. According to the Ministry of Housing & Urban Poverty Alleviation, Government of India, around 2001, in Karnataka, 40.50 lakh people lived in 2601 slums, which was 22.50% of the State's urban population. In a survey referred in the context of Indira Awaas Yojana during May-June 2003 to ascertain the number of site less and houseless families in the State, the number of urban houseless was 7.34 lakhs and number of siteless was 25.57 lakhs.

pressure and also to raise revenue, the ULBs should revisit betterment charges, land use conversion charges, land misuse charges at frequent intervals as suggested by the 'High Power Expert Committee (HPEC) for estimating the investment requirements for Urban Infrastructure Services' in its report on Indian Urban Infrastructure and Services, March 2011.

4.13 Further, the Urban Development Department also needs to work out the modalities of (i) raising resources required for completing all the schemes in the priority areas of urban drinking water supply and Under Ground Drainage (UGD) works in all the ULBs within a period of 5 years and (ii) an alternative proposal to raise resources and complete drinking water supply / UGD / Storm Water Drains / Solid waste management / Roads and Streetlights in 5 / 6 selected ULBs which could be counter magnet to Bangalore plus only drinking water supply and UGD in the remaining ULBs in 5 years.

4.14 Government has to take a clear, hard look at the vast, complex transformation that is taking place in the towns and cities of the State. The Bangalore region in particular, which is at the forefront of the country's flourishing IT related industry, receives a daily influx of young migrants from all over the country in response to the city's growing employment and business opportunities. The City is expanding in all directions with high rise commercial and residential constructions to accommodate this growth, and it is a massive task for the Government to correspondingly upgrade the civic infrastructure and services – water, power, sewerage systems, roads, public transport, etc., to the extent required. Similar efforts to a lesser degree are required in other urban centres of the State as well, as rural youth move to the cities for better employment and improved living standards.

4.15 In order to ensure better standard of living to the citizens of the State, the Government in its Vision 2020 document has set out the following targets for Urban Development.

Table No. 14**: Targets for 2020**

Indicator	Current level	Goal
Urban Poverty level	32.8 % (2004-05)	<10%
% Urban Slum Population	7.8 % (2001)	=0.(0.5% each year)
% Urban HH having access to safe drinking water	92.2% (2001)	= 100% (0.5% each year)
% Urban HH having sanitation within house	75.2% (2001)	> 90%
% Urban HH having no draining facility	19% (2001)	=0%
% Urban HH using firewood for cooking	27.6% (2001)	<10%
% Urban HH having electricity as lighting source	91.2% (2001)	=100%
Periodic City Development Plans and City level investment plans	=33%	100%
No of days to start a business	45	<10
% of investment proposals translating into commissioned projects	32%	>60%
% of workers employed in Industry	15%	20-22%

Source: Vision 2020 document published in the year 2008. *HH =House Hold.

4.16 ***There is a need to examine, in detail, the pattern and process of urbanization and its implications for present and future economic growth of the State. Long term strategies for sustainable economic growth need to be examined and evolved. In order to step up industrial development in predominantly agrarian regions of the State, the development of new urban settlement of sizable dimension in an appropriate location in central/north eastern Karnataka needs to be promoted vis-a-vis urbanisation in Bangalore.*** Some of the challenges in this regard as observed by the (Draft) Urban Development Policy includes governance in urban local bodies, land use policies, financing of urban infrastructure and addressing of urban poverty. Although a number of initiatives have been taken up to address these issues by both the Central and the State government, the effort is not keeping up with rapid pace of urbanization. ***It is critical that Karnataka augments its efforts substantially to manage the process of urbanization and the related transformation effectively, primarily by investing in urban services and developing Human Resource capacity for urban management, including financial management and asset management.***

Policies and Reform initiatives in Urban Infrastructure Development in Karnataka

a. **State Water Policy (2002):** The policy was introduced by the Water Resources Department for conservation/ management of water resources in the State, in view of the depletion of the State's water resources. The objective of this policy is to provide water in rural, town, city municipal council and city corporation areas at the rate of 55, 70, 100 and 135 litres per person per day respectively. The water policy emphasises the need for efficiency in operations, maintenance and repairs, modernization of water supply systems, completion of ongoing schemes/ committed projects, promotion of participatory management of resources, and revision of water rates in a phased manner to cover at least the operational and maintenance cost.

b. **State Policy on Urban Drinking Water and Sanitation (2002)**: There are several independent institutional agencies and distinct sets of issues involved in the delivery of services in urban areas. It was felt necessary therefore to have a separate policy statement for the urban sector. This policy statement confirms the commitment of KUWSDB and BWSSB to provide water supply and sanitation facilities to all the residents. It aims at universal coverage of water and sanitation facilities, arrangements to preserve water resources, ensuring that operations are commercially and economically viable, and ensuring that all citizens receive basic services at a minimum standard level. The policy also identifies appropriate institutional mechanisms to address the objectives including, tariff frameworks for commercial sustainability and suggesting a role for the private

sector in service delivery. A detailed sector strategy paper for an action plan is proposed to be issued to carry forward the objectives outlined in the policy statement. [37]

c. **Policy on Integrated Solid Waste Management** : A State policy on solid waste management which aims at carrying out socially, environmentally and financially viable management activities, establishing a self contained integrated operating framework for solid waste management and enhancing ULBs ability to provide effective waste management services to citizens. The Policy has laid down normative standards and procedures for collection, storage and transportation of MSW which inter alia include dustbins (one every 100 people), division of roads into categories A (daily sweeping), B (four days in a week), and C (three days in the week), staff requirements (one for every 350 m length (average road width : 80 ft), 500 m length (average road width : 60 ft), and 750 m length for average (average road width : 40 ft).

d. **Urban Development Policy :** The State is in the process of finalising an Urban Development Policy, the draft of which has been published in November 2009. The broad objectives of the policy include defining a vision of urban development in Karnataka and provision of a framework and strategy for guiding the urban development of the State so as to realize the State vision. The policy framework is envisaged to cover:

- Urban Development Strategy;
- Urban Planning - New Approach;
- Reducing and eliminating urban poverty;
- Provision of Urban Infrastructure Services;
- Environmental sustainability of cities;
- Democratic Urban Governance;
- Resource Mobilisation.

4.17 To meet the growing demand of Urban Water and Sanitation and Supply (UWSS), Government of Karnataka has initiated reform processes with support from various funding agencies, primarily the World Bank and the Asian Development Bank. The following projects have a reform initiative included in the project objectives:

a. **Karnataka Urban Water Sector Improvement Project (KUWASIP)** is a world bank assisted project introduced in 2004 to improve the quality of water supplied and provide sustainable urban water supply and sanitation for all the ULBs in the State. The objective of this project is to initiate urban water and sanitation reform process based on "Urban Water and Sanitation Policy Statement" of Government of Karnataka and to demonstrate

[37] http://www.uddkar.gov.in/watersanitation accessed on 24.04.2011

that sustainable, efficient and commercially oriented service provision can be achieved through private sector participation. For the first phase of KUWASIP, three towns viz. Belgaum, Gulbarga and Hubli-Dharwad have been selected.

b. **Karnataka Municipal Reforms Project,** started in the year 2008 is a World Bank funded project which has been launched by KUIDFC to improve the delivery of urban services by enhancing quality of urban infrastructure and promoting good governance among the ULBs.

c. **Karnataka Urban Infrastructure Development Project (KUIDP):** Under a loan agreement signed with the Asian Development Bank(ADB) in 1996, KUIDP was envisaged as an integrated urban infrastructure and institutional strengthening program for four selected towns of Mysore, Tumkur, Ramanagaram and Channapatna in the Bangalore sub region. Subsequently two more towns namely Maddur and Mandya were added to the scope of the project. The Project was completed in 2004 with a positive impact on municipal finances, including computerization and modern accounting practices in the 6 towns, and improvement in the tax receipts in most of the project towns.[38]

4.18 The 74th Constitutional Amendment requires the State governments to amend their municipal laws in order to empower ULBs "with such powers and authority as may be necessary to enable them to function as institutions of self governance". The Constitution (74th Amendment) Act, 1992 provides a basis for the State Legislatures to transfer various responsibilities to municipalities and to strengthen municipal-level governance.

Eighteen functions have been identified under the 12th schedule to the Constitution to be performed by the ULBs. Some of the salient features of the 74th Constitutional Amendment include :

a. Setting up State Election Commission.
b. Setting up State Finance Commission.
c. Setting up District Planning Committee.
d. Setting up Metropolitan Planning Committee.

4.19 However, the steady pace of implementation of the 74th Amendment in Karnataka needs further improvement. The District Planning Committees have been set up but they are hardly functional. The Metropolitan Planning Committee which is applicable only in case of Bangalore has not been set up so far.

[38] Completion Report, India: Karnataka Urban Infrastructure Development Project, Asian Development Bank, May 2006

Urban Development Department

4.20 Organisation Chart of the Urban Development Department is at Annexure 4.c.The Secretariat Department of Urban Development (UDD) has the following Departments under its administrative control.

a. Directorate of Municipal Administration (DMA) which monitors the functions of the various ULBs in the State;
b. Department of Town Planning (DTP) which is a Town planning body for the State;
c. Urban Development Authorities (BDA, MUDA) which function as planning and development authorities constituted under the Karnataka Urban Development Authorities Act, (KUDA) 1976.

Further, the secretariat is assisted in its implementation of various schemes by various institutions as under:

d. Bangalore Water Supply and Sewerage Board (BWSSB);
e. Karnataka Urban Water Supply & Drainage Board (KUWS&DB);
f. Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC).

In the following paragraphs, we have discussed the schemes and projects implemented by BWSSB, KUWS&DB, KUIDFC and the DMA. Also a brief description is provided of the Departments like DTP and the Urban Development Authorities at the end of the chapter.

I. Bangalore Water Supply and Sewerage Board (BWSSB)

4.21 The BWSSB was constituted under an Act of the Karnataka state legislature and notified vide notification no. PLM/15/MNY/64 dated 30th September 1964 and the Board came into existence on 2nd October 1964. With the formation of the Board the entire system of water supply and sanitation was entrusted to the Board in December 1964.

4.22 **Income and Expenditure**

The finances of the Board for providing water supply and making arrangements for disposal of waste water come mainly through levy of water charges and sanitary charges on "no loss no profit basis". Additionally, the Board also raises resources through state government grants, loans from financial institutions. Table 15 provides particulars of yearly revenue account from 2001-02 to 2008-09. The Board has been incurring losses which are essentially due to liabilities

towards interest repayment against loans taken from Government and other agencies, increase in power and establishment expenses.

Table 15: Revenue account from 2001-02 to 2008-09 (₹ in Lakhs)

	Revenue Account		
Year	Receipt	Expenditure	Surplus(+) Deficit (-)
2005-06	437.29	451.01	13.71
2006-07	487.21	509.31	22.10
2007-08	486.94	529.22	42.28
2008-09	534.76	594.01	59.24
2009-10	530.40	688.26	157.86
2010-11	530.40	788.18	257.78

Source: BWSSB presentation to ERC, May 2010
(*Figures up to 2008-09 as per Audited Accounts*)

4.23 The poor financial position of the Board is largely due to the water rates not being set according to economic value of water which leads to poor cost recovery. According to information available, the BWSSB incurs an expenditure of ₹ 33 per KL in supplying water, while it collects ₹ 6 to 15 per KL for the lowest three slabs of domestic consumption and ₹ 50.00 per KL for Industrial consumption.

4.24 An analysis of expenses of the Board shows that compared to 2005-06, the power charges have increased by 12.69%, establishment charges by 111.95%, O & M charges by 463.70%, depreciation charges by 176.93% and debt servicing by 68.34% (Please see Table below). The cost of providing water supply and sanitation services has increased by 75.82% from 2005-06 to 2010-11. In the year 2001 the tariff was revised to include debt servicing; after that in 2004-05 the water charges were again nominally increased to recover the extra power charges. There has been no major revision in the last few years. BWSSB has submitted a proposal to the Government for a tariff increase aiming at better cost recovery. **The Commission recommends that a quick decision may be taken by the Government on the Boards proposal taking note of the fragile financials of the BWSSB**.

Table 16: Costs incurred by BWSSB, 2005 – 2011 (in ₹ Crores)

Category of Costs	***2005-06***	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**
Power Charges	*221.84*	227.92	228.10	243.20	240.00	250.00
Establishment	*70.85*	82.33	91.77	112.30	120.55	150.17
O&M	*25.54*	28.81	39.63	60.37	115.84	143.97
Depreciation	*23.11*	62.73	64.05	61.90	64.00	64.00
Debt Servicing	*106.94*	104.50	104.02	112.47	147.86	180.03
Total	*448.28*	506.29	527.57	590.24	688.25	788.17

Source: BWSSB presentation to ERC, May 2010

4.25 Though there has been increase in the area covered by BWSSB, it has not been compensated by increase in the number of staff. Bangalore has the highest number of connections per employee which puts undue pressure and affects the quality of work. Table 17 provides a comparison of different metropolitan cities.

Table 17: Comparative Statement of Metropolitan Cities.

Metropolitan cities	Areas in sq. kms	No of connections in lakhs	No of employees	Connections per employee
Bangalore	800	610000	2381	256.2
Chennai	1189	557000	5000	111.4
Hyderabad	688	472000	6000	78.67
Delhi	1486	1670000	21000	79.52

Source: BWSSB presentation to ERC, May 2010

The staffing pattern was last approved in the year 1992. However the total connections in 1992 were 2,30,907 and this has increased to 6,10,000 for the year 31-3-2010. To further compound the problem, although the sanctioned strength of the employee is 3702 based on workload in 1992, total number of employees on actual rolls as on date is only 2381, which is about 64% of the approved staff strength.

4.26 Ground water plays important role in meeting the needs of Bangalore. Non-availability of Cauvery water supply in surrounding non-core areas (former ULBs) has resulted in increased reliance on ground water. As per the "Report of Dynamic Ground Water Resource of

Karnataka as on March 2004" published by Mines and Geology Department, Government of Karnataka, nearly 30% of the areas in the State have reached "over exploitative conditions". As per ADB report dated 5.11.2007, Water Resources in 10 out of 11 districts have reached "over exploited conditions". The areas in Bangalore Urban, Bangalore Rural, Ramanagar and part of Mysore District are in the list of over exploited condition. It is evident that there will be acute shortage of availability of surface and ground water for drinking purpose in the Cauvery Basin.

4.27 There is a huge shortfall in supply of water in Bangalore. Table 18 illustrates the following point and also provides for future projections.

Table 18: Demand - Supply situation

Year	Population in lakhs	Water Demand in MLD	Water Supply in MLD	Shortfall in MLD
2001	60	1000	540	460
2009	75	1125	900	225
2012	80	1459	1470	+11
2021	101	2125	1470	655
2031	128	2550	1470	1080

Source: BWSSB presentation to ERC, May 2010

The increase in the supply of water in the year 2012 is due to the completion of the Cauvery Water Stage IV Phase II. However if further projects are not taken up there will be stagnation in the supply which would lead to further gap between demand and supply.

To meet the growing demand for water supply and sanitary facilities to areas in Bangalore Metropolitan Area, the **Cauvery Water Supply Scheme Stage IV**, Phase II is taken up to provide an additional 500 MLD of water to the city. The core area with a well developed water supply and sewerage system was identified, and the surrounding City Development Plans (CDP) area which is the peripheral area was undertaken for development. The population projections for these areas have been carried out taking into considerations the adjoining district areas and peripheral areas. Population projections for the years 2001 and 2011 as indicated by Bangalore Development Authority (BDA) and CDP (1995) report were taken into account for designing this project.

The total cost of the project is estimated to be ₹ 3,38,370 lakh, of which ₹ 2, 83,070 lakh is provided by the Japan International Co-operation Agency (JICA) through the Ministry of Urban Development, GOI, ₹27,650 lakh is given by the Government of Karnataka and ₹27,650 lakh is provided by the BWSSB. The Project covers an area of about 598 sq Kms in Bangalore and includes metropolitan area of 565 Sq. Km. and is scheduled to be completed in the year 2011.
The project consists of four components

i. **Water Supply Component:** There are 13 water supply contracts. This component involves Raw Water Transmission (3000 MM dia. 6.3 km, 2600mm dia. 9.6km) Water Treatment Plant at TK Halli (500 MLD) , Clear Water Pumping Stations (3 pumping stations pump 500 MLD of water), Clear Water Transmission system (68 kms- 2700 mm), Trunk mains to ground level service reservoirs in city 90 kms) and Supervisory control and data acquisition system.

ii. **Sewage components:** Design review for Sewerage treatment plant (10 nos) with a capacity of 339 MLD are designed for secondary. There would be 6 intermediate sewage pumping stations and rehabilitation of trunk sewers in core areas which is dovetailed with JnNURM.

iii. **Distribution Component** (Unaccounted for Water): UFW in water in Bangalore is in the range of 35-40%. Pilot projects are taken up to reduce the UFW at 21 DMAs. Under this component it is proposed to replace the old corroded / encrusted pipelines in 6 divisions of core area with a service connections of 4,95,000 . The project has an implementation and monitoring period of 3 years each. In this project it is proposed to bring down the average leakage level from 36% to 16%, improving pressure at the consumer end, to improve consumer satisfaction level.

iv. a) **Slum Development Component:** It is proposed to provide water supply and sanitary facilities to 362 slums in the BBMP area, 82,000 water meters are proposed to be installed. 41,000 sanitary connections are proposed to be provided and 400 public toilets are established. The above component is proposed to be taken up in co-ordination with NGOs during the current year and is proposed to be completed by 2011.

b) **Management Improvement Component:** There are two aspects to this component, one is the e-governance and the other is HRD and training. Under

e-governance it is suggested to automate the operations of water and waste water treatment plants and pumping stations with supervisory Control and data acquisition to efficiently monitor and control. Additional Kiosks would be established all over Bangalore to provide multiple services including acceptance of bills on a 24/7 basis. Under HRD and training the employees are trained through different programmes to help improve their skills and motivation level.

4.28 **Greater Bangalore Water Supply & Sanitation Project** (GBWASP**)** was conceptualized to provide water and sanitation services to residents in the region of greater Bangalore. The project is funded by Government grant, Megacity loan, Beneficiary Capital Funds & Tax free Municipal Bonds. The original estimated cost of the project (₹ 34,054 lakhs) has been revised to ₹ 63,695 lakhs. The revision in cost is largely due to the speedy development of the project area during the period 2002-06, and the need to rapidly set up additional distribution systems to provide water to entire area. As against an original project provision of 1.20 lakhs house service connections, the estimate later rose to about 4 lakh houses due to rapid growth of population.

The project is implemented in three packages and the mandate of the project is to provide water supply distribution network and provide feeder mains to feed water for 2470 Km of pipeline. The taken up works are completed except for a few reaches which have been held up for want of Right of Way clearance.

4.29 **Underground Drainage under GBWASP:** The BWSSB has taken up the work of providing underground drainage facilities and road restorations to 7 City Municipal Corporations (CMCs) and 1 Town Municipal Corporation (TMCs) under GBWASP. This project is funded by Government of India, Government of Karnataka and World Bank under JnNURM scheme, at a total estimated cost of ₹62829 lakhs.

In Bangalore waste water from households and other establishments is collected through a network of small underground drainage pipes that are connected to larger pipes, which carry waste water. The city generates 875 MLD of sewerage. There are 14 sewerage treatment plants with an installed capacity of 718 MLD, however only 350 MLD is treated. The supply of tertiary treated water to BIAL and BEL etc is 4MLD, but 525 MLD is waste water flowing to the valley.

4.30 **Environmental Action Plan:** This project was set up to improve the environment, focusing on the rehabilitation of existing sewer networks as well as new construction in core areas, including laterals. One such project under the Environmental Action Plan has been sanctioned for Bangalore City by the National River Conservation Directorate, Government of India, with 70% grants from GOI and 30% from GoK, at an estimated cost of ₹ 4627 lakhs. The schemes taken up under this project include: a Sewerage Treatment Plan, water treatment with coagulation and microfiltration and reverse osmosis. This is being taken up in three packages, viz. (i) Koramangala valley works (ii) Challaghatta Valley works and (iii) Kethmaranahalli, Arkavathi and Vrishabhavati valley works. As of date 90% of work is completed in respect of the Koramangala Valley package and 80% in respect of the Challaghatta valley package. Due to failure of the tender awardee to complete his allotted work, delay in issue of right of way and other site constraints, the completion of work of these two packages is held up.

4.31 An analysis of these projects (done by iDeCK) reveals that the major cause for time and cost overrun of these projects is due to issue of Right of Way (RoW) and other site constraints. The delay was also attributable to change in scope of works, extra financial implications during execution, insufficient monitoring, etc. There is a need to undertake proper planning activities before taking up the project for implementation. It should be integrated and holistic so as to avoid time and cost overruns, perpetual 'spillover' problems with the projects continuing from year after year and never reaching the scheduled closure. The absence of any post- project evaluation and no generation of revenues even to cover the running costs of operations and maintenance also needs to be looked into.

4.32 At present, BWSSB has Sewage Treatment Plants in the Vrishabavati valley on Mysore road, at the old Airport road, at Hebbal plus another 11 plants in several different valleys. BWSSB has put up tertiary treatment plants at Vrishabavati Valley, Yelahanka, Cubban Park and Lal Bagh which treat about 3.25 MLD and supply this treated water to industries, the airport, etc. ***It is recommended that BWSSB plan a dual pipeline system and supply tertiary treated water to the 8 CMC's included under BBMP jurisdiction, as well as to new layouts formed by BDA. The possibility of using tertiary treated water in the future for water supply and irrigation purposes could also be explored. Government may also direct all ULBs, KUWSD&B to plan dual pipeline systems in all urban areas so as to supply tertiary treated sewage water, after undertaking an extensive education campaign among water users.***

II. Karnataka Urban Water Supply & Drainage Board (KUWS&DB)

4.33 KUWS&DB was constituted under the Karnataka Urban Water Supply & Drainage Board Act, 1974 as the Agency responsible for providing potable water and underground drainage facilities in the 213 urban areas of the State, excluding the Bruhat Bangalore Mahangara Palike (BBMP) areas. KUWS&DB receives State guaranteed loans from Government financial institutions and /or grants from the State government. Assets created by the Board are transferred to the respective ULBs after execution of the schemes. The water supply schemes in 205 of the 213 urban areas are being maintained by the concerned ULBs. Town municipal councils and panchayats account for about 82% of the ULBs serviced by KUWSDB. The main source of revenue for KUWSDB is the charges collected from the ULBs for the supply of bulk water, and the direct payment received from consumers in places where the Board itself manages the distribution system.

4.34 The schemes implemented in the State by KUWS&DB are: Piped Water Supply Schemes (PWSS), Urban Water Supply Schemes (UWSS) and Under Ground Drainage (UGD) Schemes. For all these schemes, well established pre-qualification criteria are laid down in the tender documents to encourage experienced and reliable contractors to participate in the tender process, and the tender process is strictly as per the KTPP Act 1999.

a) **Piped Water Supply Schemes :** This scheme is undertaken in urban areas where the population is less than 20,000 as per 1991 census. The State government provides 100% of the estimated cost as grant-in -aid. 278 schemes have been commissioned so far, since the inception of the Scheme.

b) **Urban Water Supply Schemes :** Urban areas with a population over 20,000, as per 1991 census, are covered under this Scheme which is funded 50% by financial institutions and 50% by the State Government in areas where the population ranges between 20,000 and 75,000. Schemes for areas that have a population above 75,000 are funded to the extent of 66.66% by financial institutions, 23.33% by the State Government and 10% by Local Body contribution. The Board has commissioned 168 such schemes since inception.

c) **Under Ground Drainage Schemes:** Under this scheme, underground drainage systems are provided in urban areas irrespective of the population strength. 46 such schemes have been commissioned since its inception. The scheme is financed as per the following pattern:
    a. Municipal Corporations: 50% by financial institutions, 20% by the State government and 30% by ULBs;

b. City Municipal Councils: 50% by financial institutions, 25% by the State government and 25 % by ULBs;
c. Town Municipal Councils: 50% by financial institutions, 30% by the State government and 20 % by ULBs

A study done by iDeCK at the instance of the ERC reveals the following:

i. The water supply schemes in 205 urban areas among 213 urban areas are being maintained by the concerned ULBs. The LPCD figures calculated are high, however in practise, most ULBs do not have continuous supply of water and face scarcity in summer.
ii. There is no constant monitoring of water quality across the State, and this could be a potential public health/environmental issue.
iii. The performance of the ULBs in operation and maintenance and collection efficiencies (of water charges) is below optimal.
iv. Sewerage sector has not received adequate attention, and the delivery of services is sub optimal.
v. Implementation of schemes in most cases commences without financial closure.
vi. There is no ring fencing of funds for individual schemes. However, due to delay in release of funds by the Government, it is inevitable for diversion of funds according to KUWSDB.
vii. There are delays in receipt of GoK and ULB contributions; the latter in most cases is not forthcoming, resulting in delays in execution.
viii. ULBs do not meet loan servicing obligations directly, but are met out of SFC grants, receipt of which is often delayed.
ix. Actual collection is short of demand and the maintenance and repairs expenses in the water supply is run by KUWS&DB.
x. A preliminary cash basis profit and loss statement from the annual report indicates a deficit of ₹5 crore per annum.
xi. The financial statements do not present a clear picture of assets and liabilities, and the results of the operations.
xii. The tariff structure for water supply does not adequately cover the expenses incurred, and the tariff guidelines are not uniformly implemented.
xiii. There is no independent verification of the scheme selection, design and implementation procedure of KUWS&DB. However, as per KUWS&DB, demand survey is being conducted for the preparation of DPR.
xiv. ULBs seem to be reluctant to do the operations and maintenance directly, and willing to hand over the competent parties. KUWS&DB staffs are also keen to continue the O& M operations.

4.35 Consultation with ULBs in designing projects is often limited, leading to mismatch between needs of ULB and infrastructure services provided. As the KUWS&DB would not have adequate appreciation of ground realities in a ULB, it is imperative that it consults the ULB regarding the actual infrastructural needs. On the other hand, lack of organized data in the ULBs also hinders effective prioritization and planning of schemes. In one instance of a scheme implemented by KUWS&DB, it was noted that the water supply scheme to a town of 25,000 people cost ₹ 122 crore. ***The Commission recommends that the projects should be undertaken based on a comprehensive assessment of the technical (suitability of the design), financial (sources of financing including interest rate negotiation with the lenders), environmental and quality aspects as also after taking note of alternative arrangements for drawing and storing water.***

4.36 ***In order for the Boards to serve the ULBs better a database of existing assets and its condition may be prepared by each ULB e.g. details of the distribution pipeline (length, type of pipes, condition status etc), public taps, overhead tanks, ground level reservoirs, etc., including the GIS mapping of the areas under the jurisdiction of the ULB. The data needs to be updated periodically.*** This would be in accordance with the draft Urban Policy 2009 of the State which has recommended that ULBs should be responsible for data collection, and KUWSDB and BWSSB should be restructured to work on capacity creation in the ULBs.

4.37 The responsibility of O & M has been transferred to the ULB's since 1995. However, ULBs lack capacity to provide effective O & M services. Under the decentralized regime, the inexperienced ULBs have been severely constrained by technical, financial and managerial inadequacies in fulfilling their obligations and responsibilities in an efficient manner. While it may be a good solution to make KUWSDB responsible again for the O & M for all 213 ULBs, taking away the responsibility of O & M by the ULBs would violate the spirit of 74th Constitutional amendment. ***The Commission is of the opinion that there is a need for KUWS&DB to hand hold ULBs in proper maintenance practices till they develop adequate capacity.***

4.38 Apart from the ULBs capacity for O&M, there is also the issue of the funds in this regard. As the user charges do not always fully cover the O&M expenses, there is need for providing the difference through other means. ***The project report should have a "Maintenance Plan" which includes staff requirement for maintenance and recurring cost. There is a need for a policy by the State Government on inclusion of O & M as a part of project report and it should incorporate technical, administrative and financial aspects of both execution of the project and O & Ms.***

4.39 Water supply in the state is handled in a fragmented manner. While the KUIDFC deals with only Externally Aided Projects (EAP), KUWS&DB considers itself as a mere executing

agency (like a contractor) for the schemes entrusted to it by the ULBs and the State government. The ULBs on their part pass resolution to have a water supply schemes without bothering about effective demand for water, funding of the project, cost recovery or loan servicing. The present institutional structure, thus, provides for multiple agencies, each having independent but also overlapping mandate and operations with required co-ordination lacking between the boards and ULBs. ***The Commission recommends setting up of an agency which could co-ordinate between the ULBs and Boards as well as performs certain regulatory functions.*** The agency should be technically proficient, have credible background and be driven by long term vision. The agency should be appointed by Government of Karnataka, but its independence must be ensured by keeping it distinct. Such a body would ensure that incremental investments would be undertaken only after a comprehensive evaluation of the ULBs needs and an exploration of available options. The agency could also serve as a vehicle through which the Government can put the Urban Drinking Water and Sanitation Policy of 2002 into action.

III. Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC).

4.40 KUIDFC is a company incorporated under Companies Act, 1956 with 100% equity participation from the State Government in order to ensure efficient and speedy decisions for project implementation. The company is managed by a Chairman, a Managing Director and board of directors of five members. The Chairman is usually Hon'ble Chief Minister of Karnataka.

a) <u>Jawaharlal Nehru National Urban Renewal Mission (JnNURM):</u> This project was launched in 2005 by the Government of India to provide impetus to the development of Urban infrastructure. Under this scheme, 65 cities in India are covered for development, including Bangalore and Mysore in the State of Karnataka. The scheme is to be implemented during the seven year period 2005-2012. The pre- requisites for assistance under this project are: the preparation of a City Development Plan (CDP), Detailed Project Reports (DPRs) and Time Schedules for implementation of urban sector reforms.

A State Level Steering Committee (SLSC) under the chairmanship of the Chief Minister has been constituted to identify, prioritize and recommend projects under JnNURM as per the guidelines. The SLSC has delegated its powers to a State Level Empowered Committee (SLEC) under the Chairmanship of the Chief Secretary to Government, to facilitate timely decisions on project approval, and to achieve co-ordination of various agencies and departments under JnNURM. The State government has appointed KUIDFC as the State Level Nodal Agency (SLNA) under JnNURM to assist ULBs, parastatal agencies and implementing agencies for the implementation of the projects.

Table 18: Funding pattern by JnNURM

Sub Mission	Urban Infrastructure and governance (% share)			Basic services to the Urban Poor (% share)	
City	GOI	GOK	ULB	GOI	GOK/ULB
Bangalore	35	15	50	50	50
Mysore	80	10	10	80	20

66 Projects with an investment of ₹ 4602.40 crore have been approved so far. [39] Of this, Central Government share is ₹ 2002.83 crore and State Government share is ₹ 709.53 crore, against which the GoI has already released ₹ 984.99 crore and GoK has contributed its share of ₹ 451.14 crore. Against the total releases of ₹ 1436.13 crore, an amount of ₹ 2458.81 crore has already been spent. 21 projects have been completed. 48.30% of approved investment is for Water, Sewerage & Drainage Sector, 0.70% for Solid Waste Management, 32.30% for Roads and Road related Infrastructure, 0.90% for Heritage & Tourism and 17.70 % for provision of basic services to Urban Poor. For the urban poor, 28,118 dwelling units will be built in 152 slums which would benefit about 1, 40, 590 people. Till date, construction of 8876 dwelling units has been completed. Some of the major projects taken under JnNURM include:

Name of the Project	**Amount (in ₹ Crore)**	**Implementation Agency**
Urban Infrastructure and Governance		
Remodelling of SWD - (Hebbal, Vrushabhavati, Koramangala, Challaghatta)	643.06	Bruhat Bangalore Mahanagara Palike (BBMP)
Grade separator - (Malleshwaram, R V college, Tagore Circle, Yeshwantpur circle)	65.08	
Road and bridge Works - (M G road, Koramangala, Gali Anjaneya junction)	125.99	
Under Passes (Hennur Banaswadi junction, ring road and Nagawara junction, ring road and Kadirenahalli road junction, Puttenahalli junction, Prof C N Rao circle)	117.39	
Augmentation of 100 MLD water	12.26	BWSSB
Bulk flow metering system	15.31	
EAP (Part B)	176.75	
Under Ground Drainage system and road restoration (Yehalanka, Kengeri, Byatarayananapura, RR nagar CMC)	239.09	
Passenger Amenity Centre at J'nagar	8.9	BMTC
Development of TTMC (Shantinagar, ITPL, Vijayanagar, Koramangala, Banashankari, Domlur, Yeshawanthpur)	299.05	
Bus station (Bannerghatta, Kengeri)	25.06	
Construction of Grade separators (Agara station, Iblur Junction)	56.84	BDA
Construction of under pass (along chord road at junction of magadi road and chord road)	27.82	

[39] http://www.kuidfc.com/website/webpage.nsf/ updated on 13/04/2011, website accessed on 07th May 2011,

Remodelling of Water Distribution	194.54	KUWSDB
Development of Transport infrastructure facilities at Mysore	85.26	KSRTC
Basic Services to Urban Poor		
Rehabilitation of 108 slums	451.23	KSCB
Redevelopment of 5 identified slums - pilot slums	9.73	Bruhat Bangalore Mahanagara Palike (BBMP)
Redevelopment of 13 slums	50.88	

Source : JnNURM, two eventful years, Karnataka, KUIDFC,

19 DPRs for an estimated investment of ₹ 1670.07 crore are pending approval of the GoI requiring an ACA (Additional Central Assistance) of ₹ 962.05 crore. Further 22 DPRs are under various stages of preparation with an estimated cost of ₹ 4265.57 crore.

b) <u>Karnataka Urban Water Sector Improvement Project (KUWASIP) :</u> This project was introduced to provide sustainable urban water supply and sanitation for all the ULBs in the State, and to improve the quality of the water supplied and to demonstrate, in keeping with the "Urban Water and Sanitation Policy Statement of GoK", that sustainable, efficient and commercially oriented service provision can be achieved through private sector participation. KUWASIP is a World Bank assisted project for which KUIDFC is the implementing agency. The total cost of the project is estimated to be ₹ 23700 lakh of which ₹ 18170 lakh is World Bank loan. KUIDFC is responsible for financial management, procurement, monitoring and reporting and KUWAS & DB is responsible for supervising and execution of priority investment works.

The two components of the project are (a) Technical Assistance (TA) studies for water & sanitation sector reforms at State and ULB level and (b) improved bulk water supply to three ULBs and improved service delivery in 4 selected demonstration zones of ULBs.

The project implemented by the ULBs is monitored by the Project Director periodically, and is also reviewed at Government level through the empowered committee constituted for the project. It is also regularly reviewed by the Chief Secretary, by the Government of India (Department of Economic Affairs), and by the World Bank. Quality monitoring of the project is undertaken by independent third party consultants.

The intended benefits of the project include continuous water supply, enhanced water quality, efficient operations and increased revenue collection by the introduction of streamline billing procedures.

<u>Karnataka Municipal Reforms Project (KMRP):</u> KMRB is a World Bank funded project launched by KUIDFC to improve the delivery of urban services by enhancing quality of urban infrastructure and promoting good governance among the ULBs. The total cost of the project is ₹ 1364 crore and includes the following components:

Institutional Development: with sub components like computerization of basic municipal functions, land management and planning, implementation of accounting and budgeting reforms and capacity building.

Municipal Investment Support Component: To provide ULBs with incentives in performance and to ensure selection of feasible, technically sound projects, with performance based investment support for urban basic services to 32 ULBs outside Bangalore.

Bangalore Development Component (BDC) : The programs under BDC include (a) Bangalore Road Rehabilitation Program, (b) The Greater Bangalore Under Ground Drainage Program and (c) The Greater Bangalore Pro-Poor Sanitation program.
To be eligible to receive support from this project, the ULBs need to introduce a Self Assessment System (SAS) / Capital Value System (CVS) for property tax, the ULB operating revenue should be more than operating expense and there should be completion of audit for previous financial year.

A detailed survey of the area is conducted once the project is prioritized, and consultants are engaged to prepare the DPR (Detailed Project Reports) as per World Bank guidelines. In selected ULBs web based and project monitoring mechanism is in place. Only projects where the government land is available are funded, and no funds are provided for land acquisition.

c) **North Karnataka Urban Sector Investment Programme (NKUSIP) :** To improve urban infrastructure and provide better services with special focus on improving sanitation, NKUSIP, a Asian Development Bank (ADB) assisted project, has been conceived and implemented in towns of North Karnataka in two phases. KUIDFC is the executing agency for this project and other works are implemented by KUWS& DB, Karnataka Slum Clearance Board (KSCB), Karnataka State Fire & Emergency Services (KSF & ES). This project covers 4 City Corporations, 14 City Municipal Council, 6 Town Municipal Council and one Town Panchayat. The cost of the project is ₹ 198000 lakh and it is to be implemented over a period of 8 years. ADB contributes 60% of the project cost, and GoK and the ULB would contribute approximately 40% of the estimated cost.

Phase 1 of the project includes infrastructural development such as water supply, sewerage, storm water drains, poverty alleviation programmes and non- municipal infrastructure like fire & emergency services, tourism development, etc. Phase 2 includes infrastructural development of urban roads and non municipal infrastructure like lakes.

d) <u>Karnataka Urban Development and Coastal Environment Management Project (KUDCEMP) :</u> The objective of this project is to augment infrastructure facilities in urban areas of coastal Karnataka to take up the stress of urbanization in the region and sustain growth. The project covers Mangalore, Ullal, Puttur, Udupi, Kundapur, Ankola, Bhatkal, Dandeli, Karwar and Sirsi. The project envisages additional infrastructure to provide impetus to the growth of ten identified towns in coastal Karnataka. KUIDFC has carried out Environment Impact Assessment (EIA) to assess the possible effects of the proposed urban infrastructure projects in the region. The cost is estimated to be around ₹ 996.30 crore and is funded by ADB and State Government. 94.5% of the expenditure has been incurred on this project. 67% of the funds is made available as grant and the rest as loan.

Water supply schemes in all the 10 towns are commissioned. UGD facilities are completed in Udupi, Karwar and Bhatkal, and are at an advanced stage of construction in Mangalore. Scientific solid waste management systems have been put in place in Puttur, Mangalore, Udupi, Ankola & Karwar and are being maintained by the respective ULBs. Comprehensive development of underdeveloped areas/ slums and urban transport infrastructure are completed in all 10 towns. Out of 180 contracts, 170 have been completed and balance 14 contracts pertaining to UGD at Mangalore are in progress.

(i) During its visit to the Karnataka Municipal Reforms Cell at Bangalore, the Commission appreciated the regular data collection from the ULBs and the maintenance of ULB records by the Cell. The Commission noted that, as part of the Karnataka Municipal Reforms Project (KMRP), the e-governance Department had installed a software network to regularly collect information from the ULBs in the State. The database so created was used to develop financial statements and performance indicators for the ULBs in real time. The Network based database and software had made use of GIS (Geographic Information System) to map the various residential and commercial properties in the ULBs and developed a system of generating automatic demands for property tax collections. This has led to improvement in property tax collection. ***The Commission is of the view that the methodology followed in KMRP should be documented in the form of a report so that a similar network database can be undertaken for the Boards in the State. Further the model should be upscaled to include a database of existing assets. Information regarding the condition of the assets can be regularly updated by each ULB with details of distribution pipeline (length, type of pipes, condition status, etc.), public taps, overhead tanks, ground level reservoirs, sewerage treatment plants, owned properties for self use and properties given on long lease and rent, properties not subject to tax, vehicles and such other assets belonging to the ULBs. Also the GIS mapping of the areas under the jurisdiction of the ULB and the data could be updated periodically. Further, the***

department should conduct a process audit of the project regularly through a third party to assess the potential of the software system for further improvements and increased coverage.

(ii) The Municipal Reforms Cell under KMRP has developed a Quality assurance system for Service Level Benchmarking of the ULBs. The 213 ULBs under KMRP were given rankings based on the performance levels measured for the ULBs on eight different parameters viz. water supply, complaints redressal, revenue collections, etc. A summary of the performance indicators is at Annexure 4.d. The State Urban Policy 2009 (draft) of the State has recommended that ULBs should be responsible for data collection, and that KUWSDB and BWSSB should be restructured to work on capacity creation in the ULBs. It recommends the setting up of a separate regulatory authority to complement these agencies. ***The e-governance model followed by the Municipal Reforms Cell could be further extended to include socio-economic data as part of its evaluation of ULB performance. The socio-economic data could be further used for better planning and implementation of the schemes and a focussed targeting of beneficiaries. Further, the regular data uploaded by the ULBs could be effectively used for determining the outcome and long term impact of poverty alleviation schemes in the State.***

(iii) The observations made by the C&AG, in their audit report (civil) ended 31 March 2009, highlight the need for a co-ordinated effort to avoid lapses in planning & implementation and to avoid unproductive expenditure. Execution of a water supply scheme without ensuring availability of water source,[40] or failure on the part of the implementing agency[41] to follow prescribed controls [42] are some of the observations of the C&AG. It is desirable to dovetail components into an integrated programme and their completion synchronised to derive optimal benefits. In Karnataka state, Water supply is handled in an institutionally fragmented manner. ULBs pass resolution to have a Water Supply Scheme without detailed investigations about effective demand for water, financing the project, Cost recovery, loan servicing, etc., and work is implemented by various agencies, boards, etc. The holistic approach taken in KUIDFC financed or KUIDFC monitored schemes should be extended to all the Water Supply schemes. Further, for better implementation of the State Urban Drinking Water and Sanitation Policy of 2002, ***it is suggested that ULBs should be encouraged to effectively participate, contribute and co-ordinate in the District Planning Committees for comprehensive need assessment of ULB development. Such co-ordination would ensure that incremental investments could be undertaken only after a comprehensive evaluation of the ULBs needs.***

[40] Para 3.4.3, Audit Report (Civil) for the year ended 31 March 2009

[41] Para 3.4.7, Audit Report (Civil) for the year ended 31 March 2010

[42] The Karnataka Public Works Departmental Code (Code) prescribes the checks and balances for executing public works. The Code, inter alia, requires that a work be taken up for execution only after ensuring availability of all requisite inputs such as land, designs and drawings, sanctions, funds etc.

(iv) Though a structured project management approach has been undertaken under JnNURM to identify, prioritise, implement and monitor the projects under the scheme, the process of implementing reforms under JnNURM has been slow. A summary of status of reforms in Karnataka under JnNURM as on March 2011is at Annexure 4.e. Reforms involving digitisation of property tax details and online service delivery has been delayed. Given that the release of grants from the Centre are conditional upon completion of reforms, the State Government needs to expedite the completion of reform process, so as to make full use of the Centre's grants under the Scheme. ***Given that JnNURM was envisaged with a seven year project period (2005-2012), it is recommended that KUIDFC should prepare and publish a detailed and comprehensive completion and results report of the programme, indicating the various challenges faced and the steps taken to address the same.***

(v) ***With rapid rise of urbanisation and an exponential increase in the migration of the rural poor moving to the cities for better job employment opportunities, it is vital for the State Government to increase the allocation for public sanitation to avoid further compounding of the menace relating to public sanitation.*** A study [43] conducted by the Socio Cultural Research and Study Centre (SCRC) in 2010 at Shaktinagar in Mangalore, highlights the need to take up holistic planning and implementation of slum development schemes in Karnataka. ***Under the Basic Services for Urban Poor (BSUP) component of the programme, the State government should prepare a proposal for a study and improvement of the status of public sanitation in Bangalore. The studies conducted under Integrated Housing and Slum Development programme (IHSDP) should be extended to all ULBs of Karnataka, particularly the backward districts of Karnataka like Bidar, Gulbarga, etc. Further under the Greater Bangalore Pro-Poor Sanitation program under Karnataka Municipal Reforms Project (KMRP), the Government should take up additional support for construction of toilets at the community and individual levels in slum settlements in other ULBs. The Municipal reforms cell could be asked to prepare a database of the public toilets and public sanitation facilities in the ULBs in Karnataka, so that ULBs can have a perspective planning to address problems.***

[43] Summary of findings of the study from the survey of 300 houses in Shaktinagar, Mangalore in April 2010.

Houses without toilet facilities	: 38 (12.67 %)
Poor families without BPL Cards	: 20 (9.33 %)
Individuals deprived of pension schemes	:10 (3.33 %)
Women deprived of widow pension	: 20 (9.33 %)
Houses without culverts	:103 (34.33 %)

PUBLIC PRIVATE PARTNERSHIP IN WATER SECTOR

4.41 Private sector participation in the water sector is viewed as a solution by most countries facing sub-optimal water sector services. The involvement of the private sector is in varying degrees, and there are various options for risk and responsibility allocation.

Supply of water services has not kept pace with demand in most countries. Chronic under investment, inadequate maintenance of assets, low coverage, high distribution losses and excessive water loss through leakage, unreliable flow and irregular withdrawal from acquiser are some of the problems which are common to most countries. Different nations have reacted to these situations through a variety of methods and restructuring models.

Following are the various privatization models for restructuring adopted across countries.

Table 19: **Privatization Models for water & Sewerage Services**

Privatization Process	Details
Service Contract	A specific service (discrete and clearly defined) is contracted out by the public agency to a private operator. The services contracted out could include mains rehabilitation, emergency repairs, design engineering and administrative tasks such as billing and collection. Payment is usually on fee per task basis. Service contracts are subject to frequent competition and usually last for one year. It is also common to give out separate contracts for different parts of the same city to more than one operator, thereby enabling comparative competition.
Management Contract	Under this arrangement, the private sector assumes the responsibility for core activities such as operations and maintenance of production units in a specific geographical sector or at a defined level of responsibility. Public entities legally remain the owners of the assets and bills are collected on behalf of public entities. A private company may agree to take over the responsibility for managing a service to specified standards but using the staff, equipment, vehicles and buildings of the public entity. In such a situation the private company would bring in its management expertise.
Concession Contract	The private operator is responsible for financing new investment in the network and treatment facilities over the life of the contract. The assets are nominally owned by the public entity; however, the private operator takes over responsibility of managing assets, creating new assets where required, raising finance for the new investments, providing the service, operations and maintenance, billing and collection of charges. This arrangement could apply to a specific jurisdiction or geographical area. The private operator would pay an annual fee or may receive an annual subsidy depending on the financial circumstances of the service. Such arrangements may apply in respect of commercial operations owned by an urban authority where the user charge either covers or represents a substantial proportion of the total cost.

Source: iDeCK analysis

Case Studies

4.42 A few examples of the service delivery mechanisms implemented in other countries are presented in annexure 4.f.

IV. Directorate of Municipal Administration (DMA)

4.43 The Directorate of Municipal Administration which was formed in the year 1984 oversees the functioning of municipalities and City Corporations other than Bangalore City. The Centrally Sponsored Schemes under Directorate of Municipal Administration include :

a) ***Integrated Development of Small and Medium Towns (IDSMT) :*** This is a centrally sponsored scheme which was introduced with the objective to " slow down migration from rural areas and smaller towns to large cities by development of selected small & medium towns, which are capable of generating economic growth and employment".

b) ***Schemes financed out of special grants from the 12th Finance Commission (TFC) :*** As per the recommendations of TFC, ULBs in Karnataka get financial assistance for Solid Waste Management, Energy Savings mechanism, data base creation, developmental works, maintenance of roads & bridges and buildings. TFC has suggested earmarking at least 50% of the grant. Municipalities of towns of over 100000 population as per the 2001 census are required to prepare comprehensive schemes, including programmes involving composting of waste and conversion to energy, to be undertaken with private sector participation. The Grants also provide for maintenance of roads and bridges of ULBs.

The Schemes under the DMA discussed in this section include :

a. Mukhyamantri Nagarothana Yojane
b. Urban Infrastructure Development Schemes for Small and Medium Towns (UIDSSMT)
c. Swarna Jayanthi Shahari Rozgar Yojana (SJSRY)

a. Mukhyamantri Nagarothana Yojane (MNY)

Government of Karnataka started the "Mukhyamantri Nagarothana Yojane (MNY)" in the year 2008-09 to address the infrastructure gaps, focus on all round development of cities/towns, create and expand municipal service for the benefit of the smaller towns and cities in the State, the. A budget allocation of ₹ 600 crores was made under this scheme for specific development programs like drinking water, sewerage system and road development. This scheme has two components:

1. The special ₹ 100 crore package program for the seven city corporations (Mysore, Mangalore, Belgaum, Hubli- Dharwad, Davanagere, Bellary and Gulbarga) in the State (apart from Bangalore) and

2. Chief Ministers' Small and Medium Towns Development Program (CMSMTDP).

₹ 100 crore package program

The State government introduced this program in the year 2008-09. An allocation of ₹ 100 crore has been made to each of the seven City Corporations over a period of two years. A total of 1370 works have been undertaken under this program. Funds for the project are released from the Finance Department to the Directorate of Municipal Administration (DMA), which in turn releases the funds in instalments to the ULBs after the submission of 80% utilization certification by ULBs. Implementation of the works is done by the contractors who enter into contract with the ULBs. Table 20 provides the details of funds released and utilized by the various corporations.

Table 20: Summary to Financial Progress, Special 100 crores programme, all City Corporations, Feb 2011.

Municipal Corporation	Released Funds (In ₹ lakhs)	Utilized funds (in ₹ lakhs)	% utilization
Davanagere	9100	8600	94
Bellary	9000	9032	100
Mangalore	8600	7575	88
Hubli- Dharwad	8800	7474	85
Gulbarga	7100	6100	85.9
Mysore	7100	5776	81
Belgaum	5500	4102	74
Total	**55200**	**48661**	**88**

Source PAC

Chief Minister's Small and Medium Towns Development Program (CMSMTDP)

In the year 2009-10, the State Government approved the implementation of CMSMTDP in 211 ULBs at a total cost of ₹ 1,411 crore to be financed from Urban Development Department budget grants. The district headquarter ULBs (20) have allocation of ₹ 30 crore each, taluk headquarter ULBs (143) have allocation of ₹ 5 crore each and the remaining ULBs (48) have allocation of ₹ 2 crore each. About 7,354 works covering road & drainage, water supply, welfare of minorities such as SC & STs, and improving infrastructure in slum areas are being undertaken as a part of CMSMTDP. Out of the 213 ULBs, 199 have City Development Plans (CDPs) ready or nearing finalization.

The Directorate of Municipal Administration is the nodal agency for implementation of this program. The funds flow from Finance Department to the UDD which is then transferred to Deputy Commissioners who are responsible for the successful implementation of the programme.

b. Urban Infrastructure Development Schemes for Small and Medium Towns (UIDSSMT)

UIDSSMT was launched on 3rd December 2005 as one of the sub components of the Jawaharlal Nehru National Urban Renewal Mission (JnNURM). The duration of the project is seven years beginning from 2005-06. The sharing pattern under this scheme is 80% central government, 10% state government and 10% to be raised by DMA/ULBs/parastatal agencies. The main objective of this scheme is to improve the infrastructural facilities in the cities, enhance Public Private Partnership (PPP) and promote planned integrated development of towns and cities. The components for assistance under UIDSSMT include all urban infrastructure development projects such as water supply, roads, parking space, drainage, solid waste management, sewerage, urban renewal, preservation of water bodies, prevention of soil erosion and slum up- gradation. A minimum of 20% of the budget would have to be spent for slum up-gradation and the urban poor.

In Karnataka, under UIDSSMT, water supply, sewerage, storm water drain and road projects are implemented. The scheme is implemented in 30 ULBs. Overall 38 projects have been implemented out of which 17 are water supply, 10 sewerage, 3 storm drain water and 8 are road projects. For implementation of the scheme, the nodal agency in Karnataka is the Directorate of Municipal Administration (DMA) and for water supply the nodal agency is Karnataka Urban Water Supply and Drainage Board (KUWSDB). The grants are released by the centre directly to DMAs as additional central assistance in two installments. The first installment (50%) is released on signing Memorandum of Agreement with the State Government and the balance is released on submission of Utilization Certificate by DMA.

Table 21: Sector-wise release status of projects under UISDDMT in Karnataka as on 31-8 2010.

(₹ In lakhs)

				Releases to SLNA			
Projects	No of works	Cost approved by SLSC	Incentive for DPR*	Central	State	Total	Expenditure
Water Supply	17	41,806	627	26,690	3312	30,002	25,034
Sewerage	10	7,808	117	4,496	552	5,048	4,453
SWD	3	7,320	109	3,307	370	3,408	3,608
Roads	8	11,314	169	5,972	733	6,706	4,234
Total	**38**	**68,249**	**1,023**	**40,196**	**4,968**	**45,165**	**37,329**

Source: Directorate of Municipal Administration- Project Cell, Government of Karnataka.

SLSC : State Level Steering Committee, SLNA : State Level Nodal Agency ,

* Incentive of 1.5% of approved cost can be sanctioned by SLSC as additional grants to the implementing agencies for preparation of Detailed Project report.

c. Swarna Jayanthi Shahari Rozgar Yojana (SJSRY)

SJSRY is a national urban poverty alleviation scheme which was launched on December 1st 1997, to reduce urban poverty by providing gainful employment, skill training, and financial backing and develop community structure among those below the poverty line. For the implementation of the scheme 75% of the fund is contributed by the Centre and 25% by the State (90:10 share in some poorer States). The components of the scheme are:

1) **Urban Self Employment Programme (USEP**) mainly consists of two components (i) L&S (loans and subsidies) which provides loan and subsidy through banks and (ii) assistance and technology/ marketing/infrastructure and other support to the individual poor beneficiaries.

2) **Urban Women Self- Help Programme (UWSP)** has 2 sub components (i) loan and subsidy for urban poor for gainful employment and (ii) UWSP (revolving fund) which provides funds for self help groups/thrift and credit societies formed by Urban poor.

3) **Skill Training for Employment Promotion amongst Urban Poor (STEP- UP)** aims to provide assistance in skill formation and up gradation.

4) **Urban Wage Employment Programme (UWEP)** aims to provide wage employment for unskilled and semi skilled migrants by creation of community assets.

5) **Urban Community Development Network (UCDN):** The scheme envisages to implement all of its various schemes effectively by establishing and nurturing community organizations and structures that facilitate sustained poverty alleviation. Community organizations like Neighbourhood Groups (NHGs), Neighbourhood Committees (NHCs) and Community Development Societies (CDSs) are set up in target areas.

Table 22: Physical targets and achievements under SJSRY in Karnataka.

Sl.No	Component	Beneficiaries (for the year 2009-10)	Total Beneficiaries (up to 28.2.2011)
1	USEP (L & S)	3541	6782
2	UWSP (L & S)	4747	7807
3	UWSP (Rev. Fund)	49201	71721
4	STEP- UP	15853	26579
5	Total	73342	112889

4.44 (i) The mandate of ₹ 100 crore program specifies that the funds be used for "large scale" projects only; however there is no specification as to the amount over and above which a project can be considered large scale. The allocation of the funds to the project is

discretionary and varies from a few lakhs to several crores. ***It is suggested that UDD guidelines should be made more specific as to what projects can be categorized as "large scale", so that the ULBs have specific directions as to what projects can be chosen under the program.***

(ii) The action plan for the implementation of the projects under the ₹ 100 crore package program is formulated by a drafting committee consisting of officials from all the levels (ULBs, district and State). While the guidelines for the program mention that priority should be given for drinking water projects, often it is the road projects that are given precedence***. In this regard, to avoid arbitrariness and adhocism in the choice of the projects, it is recommended that an integrated city development plan reflecting local priorities and preferences should be formulated from which the action plan should be derived.***

(iii) Across the projects under the Chief Minister's Small and Medium Towns Development Program (CMSMTDP), the time taken between submission of the action plan by the ULB and its approval by the State government ranged from two weeks to three months. Such delayed approval obviously has negative impact on the project. There is a need for interdepartmental co-ordination for land acquisition, shifting of utility lines. Also ***in order to promote sequential planning and timely execution of the projects, the time from submission of the action plan by the ULB to its approval by the State Government should be standardized.***

(iv) Under CMSMTDP, the ULBs have to send weekly online reports to the DMA. The physical inspection of ongoing projects and their implementation in all cities is done by Assistant Executive Engineer(s) from the Urban Local Bodies. In most of the cities there is only one engineer who oversees the work with the help available from the District Urban Development Centre. In smaller cities, there is usually one accountant, one data operator and one person to do odd jobs. In Siddapura there was only one accountant who was trained to do double entry system of accrual accounts. In Kollegal it was found that the city officials did not have requisite skills to evaluate the tenders online. It is found that smaller cities are severely starved of the personnel in the form of engineers, data operators and case workers. In this regard, though the use of IT in project monitoring is appreciated, it is recommended that programmes involving the use of IT should include a component of training modules for staff and personnel development. ***There is a need for capacity building in the form of training and the use of Internet Technologies for tendering and monitoring of the projects. BBMP Project monitoring through e-platform, and which is in the nature of social audit can be used as an example, with focus on (i) the need to disclose the feedback received and (ii) action taken on citizen feedback.***

(v) Urban Infrastructure Development Scheme for Small and Medium Towns, (UIDSSMT) includes all urban infrastructure development projects like water supply, roads, parking space, drainage, solid waste management, sewerage, urban renewal, preservation of water bodies and preservation of soil erosion. There are about 38 projects implemented in the 30 ULBs in Karnataka. Though solid waste management comes under the program guidelines, no project has been taken under the scheme***. It is recommended that projects under this head be taken up. Emphasis should be given on the need to create and maintain public toilets in order to mitigate Public Health problems.***

(vi) In the study of the scheme of road works in Mulki under UIDSSMT, it was observed that there were instances of delay between the submission and approval of the action plan due to discrepancies in the estimated cost, calling for revision by the ULBs concerned. The total cost overrun from action plan to tender call for the 6 projects studied was around 28.5%. On an average, taking into account all works, there was a time over run of 300%. The maximum delay of 786% occurred in case of up-gradation of the Chitrapu Gajani Road and improvement of the Karnadu Padubail Road, where both the projects were delayed nearly by two years due to incessant rains, temple related rituals and land acquisition problems. Though the office is equipped with computers and well experienced staff, there was only one junior engineer for supervision of the works, and the present personnel had not received any kind training over the last few years. ***There is a need for recruitment of more engineers, and training in e-tendering and e-payment needs to be made for better implementation of similar programs in the future. It is recommended that delay in processing and approval of DPR/action plan, and time taken for tender, be reduced significantly to achieve substantial reduction in cost overruns.***

(vii) As on January 2011, the State has spent 75.3% of the funds allocated for the UIDSSMT scheme since 1997. In the year 2008-09 and 2009-10, only 51% and 60.2% of the released funds were spent in the same year. The scheme (at the ULB level and aggregated at the State level) has an opening and closing balance every year. The closing (unspent) balance is carried forward to the next financial year. The funds are allocated and released on a yearly basis (with 2 instalments per year), but the funds not spent by the ULBs are not returned to either the Centre or the State. Since several ULBs retain unspent funds under this scheme, it is not possible to fully utilise the amount allocated. ***In this regard it is suggested that unspent money lying with any of the ULB's under UIDSSMT should be diverted to the performing ULBs. This can be adjusted if the performance improves before release of the next instalment. In order to have better clarity of accounts it is suggested that the physical targets should be set taking into account the release of the current year and the unutilized amount of the previous year. It is recommended that all the maximum unit costs be consistent with the revised***

guidelines of SJSRY. For this purpose, DMA should compare releases with expenditure for all the ULBs in the state. The performance analysis can be done simultaneously with the strengthening of ULBs reporting requirements. The exercise can also be repeated on a component- by component basis.

(viii) There is no monitoring of the outcome of the SJSRY programme or its individual components. The broad objective of SRSJY is to reduce urban poverty by providing gainful employment and empowering the urban poor so that they can rise above the poverty line. Though the programmes do provide gainful employment over a limited period of time, there is no monitoring of the sustainability of their employment and the end benefits. ***In order to evaluate the SJSRY scheme for its outcome and benefits, the State Government should undertake a study of the beneficiaries and determine the number of people who have actually risen over the poverty line. Such study would also help to provide aid and scheme benefits to focussed and targeted beneficiaries.***

V. Department of Town Planning

4.45 The Department of Town Planning in the State has been established under The Karnataka Town and Country Planning Act, 1961, with the main object of promoting the planned physical development of urban and rural areas. It is headed by the Director of Town Planning and has four Divisional offices at Bangalore, Mysore, Gulbarga and Dharwad respectively which are headed by Joint Directors of Town Planning. The zonal regulations which are drawn up by the Department for the different urban regions and incorporated as part of the respective Master Plans cover the following aspects:

a. Land use zoning regulation prescribing the uses permissible under different urban uses of land;

b. Regulation for controlling the construction of buildings, prescribing minimum setbacks, maximum plot coverage, maximum height of buildings, maximum floor area ratio, etc;

c. Regulations for sub division of land;

d. Standards for off street parking;

e. Building lines and widening of important roads;

f. Rain water harvesting; etc.

VI. Urban Development Authorities

4.46 In Karnataka, there are 28 Urban Development Authorities constituted under the Karnataka Urban Development Authorities (KUDA) Act, 1987. The main functions of the Urban Development Authorities are:

a. Preparation of development plans (Outline Development Plan / Comprehensive Development Plan / Revision of Comprehensive Development Plan),
b. Enforcement and implementation under provisions of the Karnataka Town and Country Planning (KTCP) Act, and
c. Acquisition and development of land to provide sites / houses under the provisions of the KUDA Act.

These Development Authorities work as Planning Authorities for the respective Local Planning Areas declared under the Karnataka Town & Country Planning Act. They are responsible for the preparation and enforcement of Master Plans approved by the Government. The Development Authority is also a body corporate with a Chairman and other members appointed by the Government. The executive head is designated as Commissioner and is an ex-officio Member. The Chairman, the Town Planner Member and the Engineer-Member are the permanent members of the Authority. The Members of the Karnataka Legislative Assembly representing a part or whole of the urban area where the Development Authority is constituted are also members of the Development Authority.

Bangalore Development Authority

4.47 The Bangalore Development Authority, which came into existence in 1976 as a successor to the erstwhile City Improvement Trust Board, is the Planning Authority for the Bangalore Metropolitan area. As Planning Authority, the BDA is required to prepare a Comprehensive Development Plan (CDP) for the Bangalore Metropolitan area which must be revised once every ten years as per section 25 of the Karnataka Town and Country Planning Act 1961. The first Comprehensive Development Plan for Bangalore Metropolitan area was approved on 12.10.1984. The next Revised CDP was approved on 05.01.1995 and is still in force. The total jurisdiction of the BDA as per the Revised CDP is 1279 Sq. Kms. Area, out of which 682 Sq. Kms is demarcated as Green Belt. The conurbation area (urbanisable area) is 597 Sq. Kms. including spotted development. Out of this conurbation area, about 225 Sq. Kms. areas is the Bangalore Mahanagara Palike area. Since inception, the BDA has allotted 76,000 sites to individuals for construction of residential dwellings. In addition, more than 800 civic amenity sites have been given for use by various public utilities, and to organizations catering to the felt needs of particular localities. The receipts of the BDA comprise capital receipts by way of sale of residential & commercial sites, houses and flats. The revenue receipts include property tax, rent

from commercial complexes and other miscellaneous receipts. The BDA prepares an annual budget for each financial year for its revenue and expenditure.

Mysore Urban Development Authority

4.48 As per the Karnataka Urban Development Authorities Act 1987, the City Improvement Trust Board (CITB), Mysore and Local Planning Authority of Mysore were amalgamated and the present Mysore Urban Development Authority came into existence. The Mysore Urban Development Authority (MUDA) was constituted on 16th May 1988 and has formed many layouts and distributed nearly 35,000 sites and 10,000 houses after it came into existence. It has handed over the developed layouts to Mysore City Corporation for further maintenance. Vijayanagara Layout (1st, 2nd, 3rd and 4th Stage) formed by the Authority is the biggest layout in South Asia, with an area of nearly 2000 acres and 25,000 sites.

4.49 Under the Karnataka Town Planning Act, Master plans for all the urban areas of the State are to be prepared by the respective Planning and Development authorities, and these are to be approved by the Director of Town Planning. The Act requires that these Master Plans should indicate the proposed land uses, and zone areas for use as residential, commercial, parks and playgrounds, public and semi-public, industrial, agricultural, recreational, or educational and other public purposes, as the case may be. The Master Plans should also have proposed circulation pattern and a set of zonal regulations. The Planning and or the Development Authority are required to revise the plans every 10 years and get them approved by the State Government through the Director of Town Planning. Subsequently, town planning schemes are required to be prepared for the planning area for implementation of the proposals of the Master Plan. These town planning schemes contain detailed proposals for laying of new streets, reconstitution of plots, provision of amenities and other facilities, etc.

4.50 In the present system, the Government does not possess adequate data for infrastructure planning. This lack of relevant data has hampered the ability of the ULBs and other decision making bodies to plan in a systematic way. Government initiatives in creation of Metropolitan Planning Committees in small cities and District – level planning authorities for other regions should be supported with a data infrastructure for long term planning. The Karnataka Town and Country Planning Act, 1961 is envisaged to regulate planned growth of land use and development by preventing unequal and chaotic growth of towns and cities in the State. In this regard, the Commission recommends that the ***Directorate of Town planning under the Secretariat should be encouraged to develop and put together a Long Term Urbanisation Plan for Karnataka by making effective use of the City Development Plans of the ULBs and the data infrastructure provided by the Municipal Reforms Cell.***

4.51 Observations made in the audit report [44] of the C&AG indicate that the Bangalore Development Authority could avoid litigation and unnecessary expenditure by ensuring a database of ownership titles of layouts and sites managed by the BDA. Further, in order to maintain a structured process for the revenue earned from the various properties owned by the ULBs, Municipal corporations and various boards***, it is essential that a register comprising the government assets owned and maintained by these bodies should be prepared and updated regularly. Further, as per section 4 (n) [45] of The Karnataka Local Fund Authorities Fiscal Responsibility Act, 2003, local bodies are required to follow prudent financial management principles. The asset register should contain details of assets (separately in the form of land and buildings) owned, auctioned or leased by the ULBs, municipal corporations and the various boards. The details regarding collections of tax and revenue from such assets and the details regarding assets exempted from tax should be maintained in the registers. Further the list of beneficiaries of development rights awarded under Section 14B of the Town and Country Planning Act, should be included as part of the register.***

[44] Para 4.2.3, Audit Report (Civil) for the year ended 31 March 2008, C&AG

[45] 4. Financial management principles.- Every local fund authority will be guided by the following financial management principles, namely:- (n) ensuring that physical assets of the local fund authority are properly

maintained;

The Expenditure Reforms Commission has studied the functioning of various Government Departments and Agencies, and is submitting its recommendations in a set of five Reports. The First and Second Reports were sent in February 2010 and February 2011 respectively. This is the Third Report.

In these first three Reports, the Commission has:

a) made an over-all review of Public Expenditure in Karnataka from the point of view of its contribution to economic growth and human development,

b) offered advice regarding prudential principles of expenditure management,

c) suggested measures for strengthening the instruments of legislative and executive control over expenditure and

d) stressed the need for introducing more rigorous pre-Investment Project Appraisal practices as well as structured Project Implementation Techniques in Government.

In addition, the Commission has studied the schemes of fifteen Departments in the Social Sector, Agriculture and Allied Fields, and in the area of Infrastructure, and has made recommendations to improve their efficacy. Wherever necessary, suggestions have been made for modifications in organisational structure, training of staff and introduction of new technology, including I.T.

The next report will cover the Department of Forests, Environment and Ecology, and the Department of Rural Development and Panchayat Raj. Certain generic issues in the TOR will also be taken up, viz. Levy of User Charges, Subsidies, Implementation Mechanism for Service Delivery and Performance Monitoring of Development Schemes and Programmes. This Fourth Report is proposed to be submitted to the Government in the first week of June, 2011.

The Fifth and final report will discuss selected issues pertaining to the Home Department, and the Department of Law, Justice and Human Rights, the study of which has been entrusted by the ERC to the National Law School of India, University, Bangalore. This Report will be submitted to Government before the end of June 2011.

These reports of the ERC may be circulated among the Secretaries to Government, Heads of Department, Chief Executives of P.S.Us, Urban and Rural Local Bodies concerned, and to Universities, Research Institutions and other individuals / Institutions as the Government deem appropriate, with a view to initiate informed discussion and debate regarding Expenditure Management by the State.

We take this opportunity to express our sincere thanks to the officers of the Government Departments, P.SU's and Local Bodies involved in these studies for their co-operation and valuable contribution to the deliberations of the Commission.

Shri L.V. Nagarajan
Member

Shri Mohandas Pai
Member

Shri B.K. Bhattacharya
Chairman

Shri Sanjiv Kumar
Member

Shri G. Ramesh
Member

Bangalore:
Date: 24-05-2011

Annexures

Annexure – 1.a

Status of a few completed road projects in Karnataka

Project	Date of Commencement	Date of Completion	Actual Completion	Project Duration (Months)	Time Over Run (Months)	Time Over run (percent)	Implementing Agency
Jewargi – Bijapur State Highway (Package –JB1) – 36.8 kms	Jun-02	Jun-04	Oct-04	24	4	17%	KRDCL (Public Works Department)
Improvement of Old MC road	Jan-03	Jan-04	May-05	12	16	133%	KRDCL (Public Works Department)
Widening and strengthening of Jewargi – Bijapur State Highway 12 (Package –JB4)	Dec-03	Oct-05	Aug-05	22	-2	-9%	KRDCL (Public Works Department)
Widening and strengthening of Wadi- Raichur road km 41.00 to km 88.00 in Gulbarga (Yadgir – AP border)	Feb-04	Feb-06	Feb-06	24	0	0%	KRDCL (Public Works Department)
Widening and strengthening of Jewargi – Bijapur State Highway (Package –JB-3)	Dec-03	Dec-05	Dec-06	24	12	50%	KRDCL (Public Works Department)
Widening and strengthening of existing Bilikere – Belur (Package BB1)	Jan-04	Jan-06	Jun-06	24	5	21%	KRDCL (Public Works Department)
Widening and strengthening of existing Bilikere – Belur SH (Package - 88) – 35 kms	May-03	May-05	Feb-07	24	21	88%	KRDCL (Public Works Department)
Widening and strengthening of Wadi- Raichur road 15.00 km to 41.00 km in Gulbarga – 26 kms	Feb-04	Feb-06	Feb-06	24	0	0%	KRDCL (Public Works Department)
Karnataka State Highway Improvement Project (KSHIP - 1)	Aug-01	Dec-06	Jul-10	65	44	67%	KSHIP (Public Works Department)

Source : KRDCL, iDeCK, Time over run = Actual duration (completion of project) less Scheduled Project Duration; Time over run (percent) = Time over run/Actual project duration *100

Status of a few on-going Irrigation projects in Karnataka

Project	Year of Commencement	Original Estimated Cost (₹ Lakhs)	Revised Project Cost as on Mar 2010 in ₹ Lakhs	Physical progress as on Mar 10	Cost Over Run (percent)	Agency/ Department
Ghataprabha-III	1972	9054	143500	91%	1485%	KNNL/ Water Resources Department
Hemavathy Tumkur	1968	1630	212600	75%	12943%	CNNL/ WRD
Upper Tunga	1991	27140	105288	23%	288%	KNNL/ WRD
Kabini	1959	320	39000	50%	12088%	CNNL/ WRD
Hipparagi	1973	18670	152178	25%	715%	KNNL/ WRD
Karanja	1970	990	53200	64%	5274%	WRD
Yagachi	1983	3538	44000	14%	1144%	CNNL/ WRD
Markendeya	1998	12000	34184	75%	185%	KNNL/ WRD
Varahi	1980	943	56960	2%	5940%	KNNL/WRD
Dudhganga	1992	12400	30980	25%	150%	KNNL/ WRD
Amarja	1975	570	21945	25%	3750%	KNNL/ WRD
Kamasamudra L.I.S	1985	100	7000	10%	6935%	CNNL/ WRD
Basapura lift	1993	455	2696	39%	493%	KNNL/ WRD

Source : Annual report, Performance budget, Water Resource Department, 2009-10. Cost over run = Revised Project Estimate less Original Project Estimate; Cost over run (percent) = Cost Over run/Original Project Estimate * 100

Project Management Perspective, presentation to ERC by Mr. B G Jayaram

Key Recommendation -1

- Adopting key Professional Project Management Practices in Govt Projects :
  - using of WBS [Work break down structure] for estimation and milestone tracking . Existing Bill of Material could be included suitably
  - Adoption of Risk Management practices
  - Use of Earned Value Technique for large / complex projects
  - Status tracking on milestone basis
  - Setup of PMO concept and responsibility and ownership
  - Identifying dependencies to project schedule and working to plan

- Building Professional Project Management Culture and skill
- Instead of finding defects at the end of project work – milestones needs to be defined , defects identified and rectified at these stages
- Adopt Project dashboard to monitor and review at Sponsor level – say Dept. Head level/ Sec level and also at DC level
- Setup up a core team to develop strategic plan for the state to adopt Professional project management practices in phased manner

Key Recommendation-2

- Adopt Professional Project Management approach in all Govt Projects
  - ✓ For defining work to be done
  - ✓ For Initial plan and baseline
  - ✓ For monitoring and Control
  - ✓ Status tracking and change management
  - ✓ For aligning benefits expected vs outcome planned
- Setup PMO or similar organization structure to monitor key projects progress

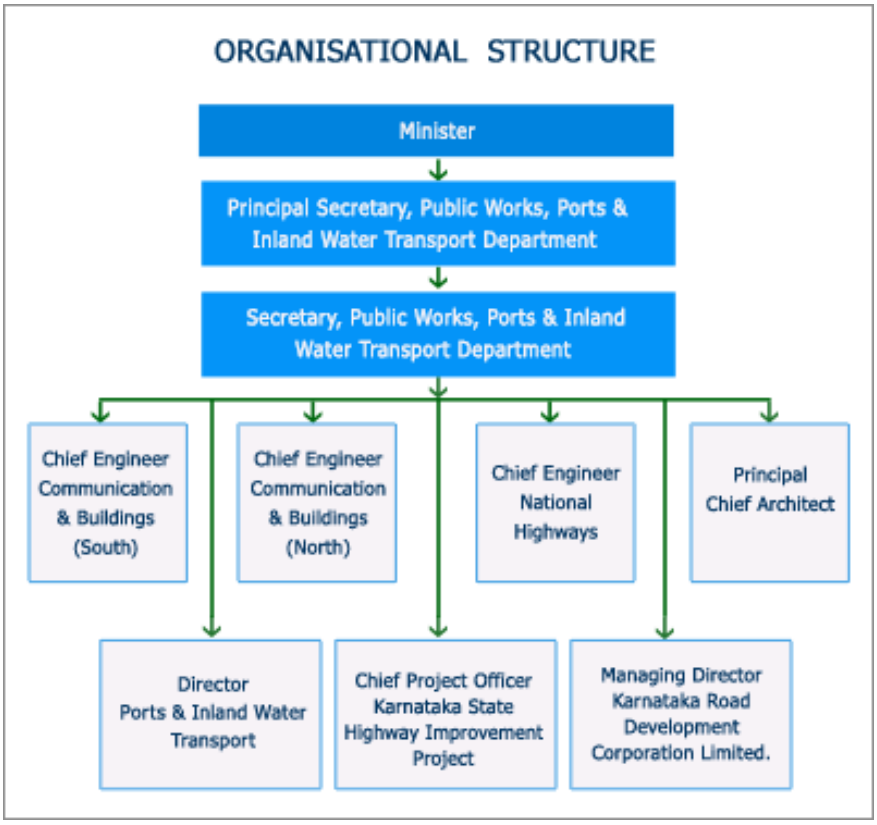
- Adopt & Use Web based Project Management tool such as from IndianCST –also bring higher transparency on Public Projects
- Staff training to include exclusive project management skill development at executive level and operational level . PMI Bangalore Chapter or Infosys team can help and guide establishing this

Key Recommendation-3

- Bringing modifications to policies and procedures
  - ✓ existing practices have good rules and regulations meets financial compliance and legal needs
  - ✓ Modifications are needed to bring professional project management approach that would help in cost optimization and completion of work on time with transparency on quality
- Sensitizing appropriate people involved in projects on using Professional Project management approach

- Setup of a Steering committee with support from PMI India and Industry for finalizing proposal and draft plan for enhancing Project Management skill in Govt. Depts.
- Developing Project Knowledge Data repository, based category wise and region wise that helps in selecting and planning new projects in the region

Organisation Chart – Department of Public Works, Ports and Inland Water Transport



Source : Website, Public Works Department, Karnataka accessed on 21.03.2011

Composition of Roads in Karnataka over the years

Length in Kilometers

Category of Road	Road length (in km)					
	1956	1966	1976	1986	1996	2009 (Provisional)
National Highways	864	1,269	1,968	1,968	1,997	4,490*
State Highways	5,983	6,640	7,554	7,912	9,395	20,905
Major District Roads	7,006	13,180	12,980	15,999	28,311	47836
TOTAL	**13,853**	**21,089**	**22,502**	**25,879**	**41,703**	**73231**

Source : iDeCK,
* 915 km is under NHAI 915 km and 3515 km is under CENH

Length in Kilometers

Category of Road	Year					
	1956	1966	1976	1986	1996	2009 (Provisional)
Surface Details:						
Cement concrete and black topped	3,584	13,117	19,483	22,476	33,139	65,746
Water bound macadam	10,106	7,209	2,825	3,159	8,075	5,721
Unmetalled	163	763	194	244	489	1,764
Total	**13,853**	**21,089**	**22,502**	**25,879**	**41,703**	**73,231**

Source: MIS 2009, KRDCL

Note:
Total length of SH : 20,905 km (excluding lengths recently upgraded to NH)
Single Lane (3.75 m) : 9686 km (46.33%)
Intermediate (5.50 m) : 8615 km (41.21%)
Two Lane (7.00 m) : 2441 km (11.68%)
Four lane (2 x 7.00 m) : 163 km (0.70%)

Annexure 2.c

Location, Features and Facilities at Ports under State Control in Karnataka

Name of the Port	Location	Features	Facilities	Revenue earned in 2009-10 (₹ In Lakhs)	Traffic handled in 2009-10 (in '000 tonnes)
1. **Karwar Port**	• Latitude 140 48' N Longitude 740 07' E • 64 Kilometers south of Marmugoa Port on the Southern side of the Kali River	• Designed to 9.75 mtr. draft • Close to Konkan Railway line, N.H 17 • all weather natural minor port • Caters 2 lakhs Sq.km. Hinterland covering 3 States	• 355 Mts. wharf accommodating two ships of 9.75 (8.25) Mts. with other matching facilities • 205 Mts lighterage wharf of 2.5 Mts draft. • Stone masonry wharf of 800'. • 250 Mts. long break-water • One transit shed of 150 Mts & 24 Mts. • Two transit sheds of 10 x 18Mts. • 30 Tonnes capacity weigh bridge. • One Warehouse of 120 x 24 Mts. (Owned by State warehousing corporation.)	1220.46	2237.577
2. **Belekeri Port**	• Latitude 140 42-50' N Longitude 740 16' E • 26 Kms. south of Karwar on the bank of Hattikeri river	• Vast stacking area and good network of roads • Close to Konkan Railway Broad guage line, N.H.17, N.H 63	•Dry stone masonry wharf of 250 Mts. length. •Transit shed with floor area of 146.08 Sq.Mts. •Mechanical ore loading chutes – 2 Nos. • Morse signalling cabin	1480.28	6273.902
3. **Tadri Port**	• Latitude 140 13.50' N and Longitude 740 21.50' E • Estuary of the Aghanashini river	• Vast stacking area and scope to develop with modern infrastructural facilities • Close to Konkan Railway line, N.H.17 • Vast water front facilities	•Light House structure, R.C.C. jetty, transit shed.	1.12	--

Name of the Port	Location	Features	Facilities	Revenue earned in 2009-10 (₹ In Lakhs)	Traffic handled in 2009-10 (in '000 tonnes)
4. Honnavar Port	• Latitude 140 16.30'N and longitude 740 27.10 E • Right bank of the Sharavathi river	• Surrounded by hills, forests and Sharavathi river • Close to Konkan Railway line, N.H.17 • Environmental position is quite good	• First stage Lighterage wharf of 400' long with a stacking area of 69,000 sq.ft. • Second stage lighterage wharf 564' long with about 3,00,000 Sq.ft of stacking area. • Transit shed facility	13.36	--
5. Bhatkal Port	• Latitude 130 58' N and Longitude 740 32' E • bank of Bhatkal river	• Surrounded by hills and river • Close to Konkan Railway line and N.H.17 • No environmental threat	• Lighterage wharf – 186 M length with a stacking area of 15,888 Sq.Mts. • Transit shed facility • Import/Export cargo shed facility	0.06	--
6. Kundapur Port	• Latitude 130 38' N and longitude 740 40.50' E • Right Bank of the Pancha Gangoli rivers	• Close to Konkan Railway line and N.H.17	• Storm Groyne near port office Gangolli – 159' length. • R.C.C. Wharf measuring 700' x 124'. • Stacking platform cum jetty of Kundapur side measuring 181' x 136'. • Cargo weighing shed. • Transit shed.	17.06	--
7. Hangarkatta Port	• Latitude 130 27' N and Longitude 740 42' E • Bank of Sita and Swarra River	• Close to Konkan Railway line and N.H.17	• Wharf in front of Port Office. • Wooden jetties – 2 Nos.	0.29	2.078
8. Malpe Port	• Latitude 130 21' N and Longitude 740 42.5' E • mouth of Malpe river in Udupi District.	• major fishing harbour	• Flag – mast. • Transit light wooden mast. • Wharf measuring 100' long. • Retaining wall of 605' length. • Cargo stacking platform i) 200' x 50'	0.29	--

			ii) 50’ x 50’ iii)7400 Sq.ft. • Passenger jetty. • Two wooden jetties, measuring 5.79 Mts x 6.10 M. each. • Wooden jetty at wharf measuring 38.98 Sq.Mts. • Passenger shed (104’ x 23’.8”) – 1 No. • Cargo shed (53’ x 23’) – 1 No. • Light House at DG Island.		
9. Padubidri Port	• North of Mulki river			-	--
10. Old Mangalore Port	• Latitude 120 52’ N and longitude 700 51’ E • left bank of the Gurupur river and is approximately 10 Km south of the New Mangalore Port.	• Close to Konkan Railway line and N.H.17 • Linked by Air also.	• North wharf – 293.83 Mts. length. • Central wharf – 299.95 Mts. length • Salt wharf – 76.00 Mts. length • South wharf – 252.00 Mts. length • New south wharf – 362.71 Mts. length. • Godowns • General Store, Passenger shed • Pump House and Port Well. • Furnace oil overhead tank. • Sheds in Dry dock area. • Resting shed. • Light house signal cabin and flag staff tide gauge station and store shed • Inspection shed. • Community hall (Bengre thota sand spit). • Transit shed at the south wharf.	160.53	75.067

Source : http://www.karnatakaports.in/ accessed 28.03.2011

Statement showing the Financial Targets and Achievements under State Sector Schemes for roads and bridges during 2009-10

Schemes	Financial (₹ Lakh)			Physical		
	Target	Actual	Percent Actual/ Target	Target	Actual	Percent Actual/ Target
Other Roads formation	70264	70264	100%	260	2611	1004%
Construction/Improvement of roads and bridges under NABARD	26870	26870	100%	1064	2050	193%
Central Road Fund (CRF)	20556	20556	100%	882	1222	138%
Chief Minister Rural Road Fund	18000	18000	100%	12100	18139	150%
Special Component Programme (SCP)	5000	4959	99%	429	221	51%
Tribal Sub Plan (TDP)	1383	1382	100%	229	99	43%
Suvarna Rasthe Vikasa Yojane (SDP)	5000	4600	92%	246	209	85%
State Highway Maintenance	4000	4000	100%			
Suvarna Rasthe Vikasa Yojane	10000	10000	100%	1238	473	38%
Dr. D M Nanjundappa Report SDP (NABARD)	8000	7999	100%	384	197	51%
SCP (NABARD)	4382	4122	94%	285	245	86%
TSP (NABARD)	1500	1500	100%	134	91	68%
Total	**174954**	**174251**	**100%**			
Supporting Schemes						
Direction and Administration	200	200	100%			
Machinery and Equipment	39	39	100%			
Total	**239**	**239**	**100%**			
Total State Sector	**175193**	**174490**	**99.6%**			

Source : Annual Report, 2009-10, Public Works, Ports and Inland Water Transport Department, Government of Karnataka.

Projects taken up by KRDCL during the year 2009-10

Project Name	Road Length		Project Cost (₹ Crore)
Roads	**989**	**Km**	**1367**
Widening and strengthening of Mysore-Bantwal road			
Package B (Kushalnagar to Sampanje)	60	Km	129
Package C (Bantwal to Sampanje)	72	Km	176
Improvement to road from Belgaum to Chorla (via Jamboti Peeranavadi)	50	Km	76
Gulbarga ring road stage II (Jewargi to Aland Road)	8	Km	31
Construction of Grade Separator at Kengeri on Bangalore -Mysore Road			23
Improvement to Basavakalyan road from 2.5 Km to 4.5 Km	2	Km	
Improvements to Sarasamba-Ribbanpalli (Waghdhari-Ribbanpalli) - VGF	135	Km	248
Improvements to Dharwad-Ramnagar road on BOT basis on VGF	60	Km	230
Chikkanayakanahalli-Hassan road on BOT basis 40% - VGF	72	Km	
Construction of outer ring road to Hassan Town	53	Km	188
Bangalore Mysore Road (Annuity)			
Improvement and widening of Hubli-Laksheshwara road	43	Km	267
Mega Road Project	433	Km	
Bridges	**763**	**Nos**	**825**
Construction of Bridges- Phase II	256	Nos	241
Construction of Bridges- Phase III	174	Nos	229
Construction of Bridges - Phase IV	325	Nos	284
Construction of bridge across Maharudrappanahalla in Bagalkote	1	Nos	33
Construction of Bridge at Sagar Pataguppa road Hosanagar	1	Nos	
Construction of Bridge on Yagachi river near Malliganahalli	1	Nos	4
Construction of Bridge in Hirisave Chattahalli road across Hemavathi river at Gannikeda	1	Nos	8
Construction of Bridge across Ghataprabha river on Ghataprabha railway station to Konnur Village	1	Nos	16
Bridge across backwaters of sharavati nerar Ambaragod in Sagar Taluk	1	Nos	
Construction of Bridge across Krishna near Jambagi in Bagalkot District	1	Nos	
Construction of bridge across Malaprabha near Munnavalli on Arabhavi Challikere road	1	Nos	10

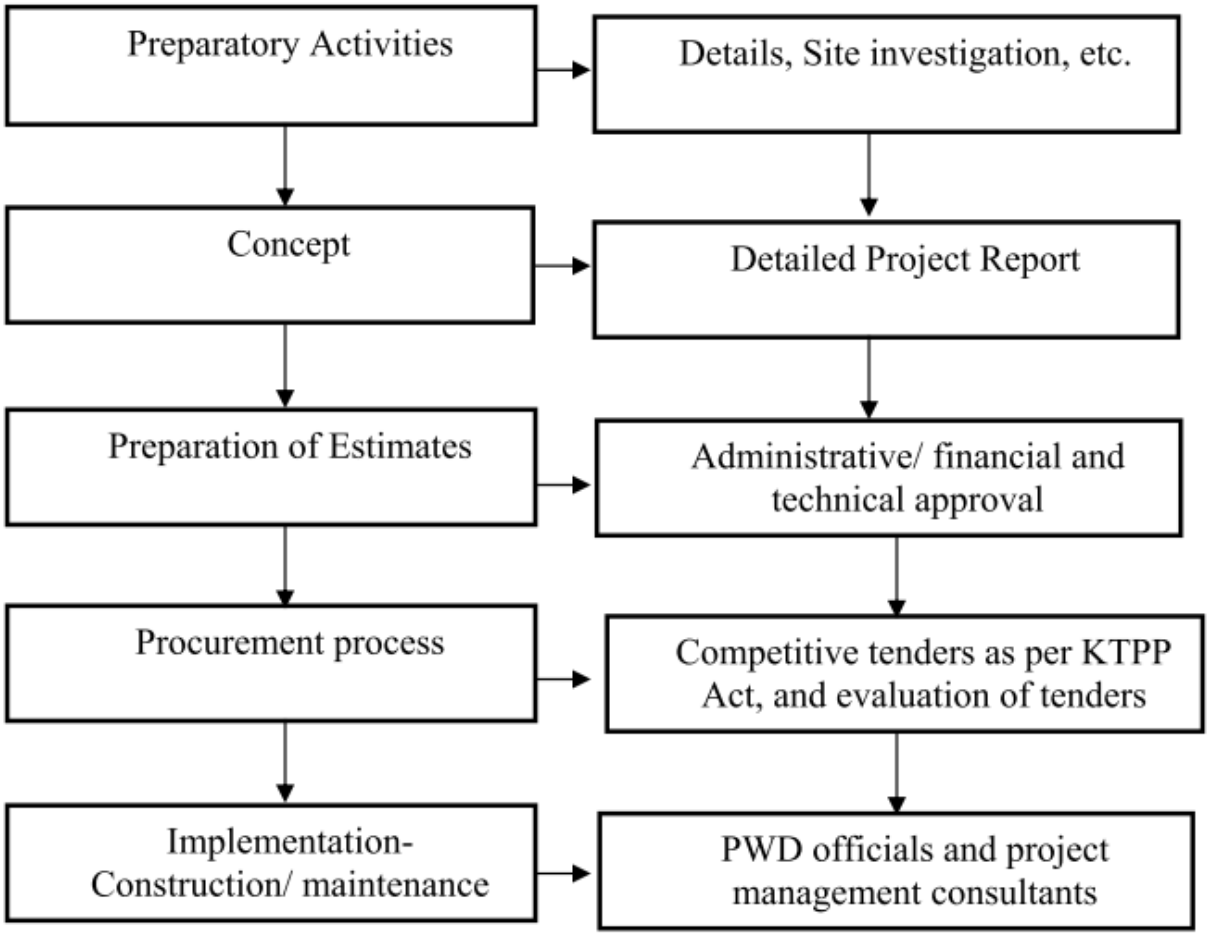
Source : Annual Report, 2009-10, Public Works, Ports and Inland Water Transport Department, Government of Karnataka.

Comparison of Road Network in Karnataka with respect to few other States

States	Category of roads	National Highways	State Highways	Major District roads	Village roads	Road Length/ Sq km
Maharashtra	Road Length (KM)	3688	33212	46473	149056	0.7
	percent of total length	*2%*	*14%*	*20%*	*64%*	
Andhra Pradesh	Road Length (KM)	3674	10231	53408	120282	0.69
	percent of total length	*2%*	*5%*	*28%*	*64%*	
Kerala	Road Length (KM)	1523	3784	11711	6060	0.59
	percent of total length	*7%*	*16%*	*51%*	*26%*	
Tamil Nadu	Road Length (KM)	4647	9259	45822	110272	1.3
	percent of total length	*3%*	*5%*	*27%*	*65%*	
Karnataka	Road Length (KM)	3958	20738	47763	137392	1.09
	percent of total length	*2%*	*10%*	*23%*	*65%*	

Source : Vision 2020 - PWD

Project Selection and implementation process followed by the Public Works Department



Source : iDeCK

Karnataka Geo Climate features

Geography	Location : Deccan Plateau Area : 1,90,498 sq.km (5.81% of the total area of the Country) Eighth largest State in the country
Physiography	Elevation : between 450 to 900 mts. above mean sea level. Important hill ranges : Western Ghats, Baba Budan Ranges and Chitradurga Hills. Important peaks : Mullayyanagiri (1913 mts.) in the Baba Budan Hill ranges and Kudremukh (1981mts)
Climate	West Coast, the ghats and malnad areas : Very humid rainy monsoonal climate; East : Semiarid warm dry climate
Rainfall :	Large variation with higher amounts in the Western Ghats and reducing towards the eastern plains. Normal Rainfall Coastal Dakshina Kannada District : 4000 mm Bijapur, Raichur, Bellary, etc, : 500mm to 600mm
Water Resources in Karnataka	Average annual yield of the rivers of the Karnataka (Rough Estimate) : 98406 m.cum. (3475 TMC). Economically utilisable water potential for Irrigation : 48,000 Mcum (1695 TMC).

Source : Website, Water Resources Department, Karnataka accessed on 17.03.2010

River Basins - State wise Catchment Area

Sl. No.	Name of the Basin State	Krishna River System	Cauvery River System	Godavari River System	Total
1.	Karnataka	113271 ***44%***	34273 ***42%***	4406 ***1%***	151950 ***23%***
2.	Maharashtra	69425 ***27%***		152199 ***49%***	221624 ***34%***
3.	Andhra Pradesh	76252 ***29%***			76252 ***12%***
4.	Kerala		2866 ***4%***		2866 ***0.4%***
5.	Tamil Nadu		43868 ***54%***		43868 ***7%***
6.	Karaikkal region of Pondicherry		148 ***0.2%***		148 ***0.02%***
7.	Madhya Pradesh			26168 ***8%***	26168 ***4%***
8.	Chhattisagarh			39087 ***12%***	39087 ***6%***
9.	Andhra Pradesh			73201 ***23%***	73201 ***11%***
10.	Orissa			17752 ***6%***	17752 ***3%***
	Total	258948	81155	312813	652916

Source : Website, Water Resources Department, Karnataka, accessed on 17.03.2011

Figures in Bold Italics indicate percentage to Total Basin Catchment Area (Last row in the table)

Details of River Systems (Tributaries), Karnataka

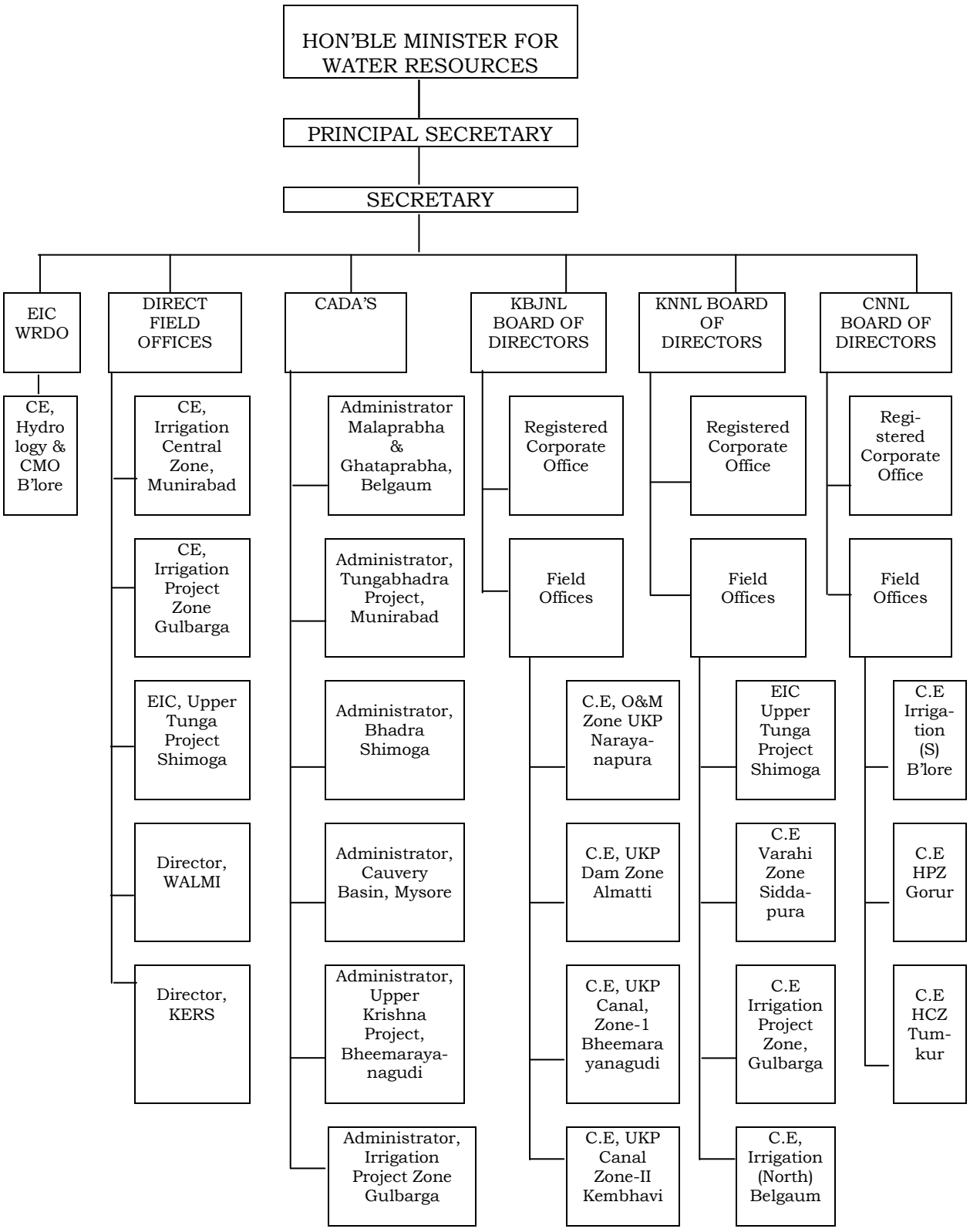
Sl. No.	Name of the tributary	Catchment area in Sq.kms	Origin , Altitude & Length	Sub-tributaries	Name of the state
Krishna River System					
1.	Ghataprabha	8829	Western ghats, 884m, 283kms	Hiranyakeshi, Markandeya	Maharashtra, Karnataka
2.	Malaprabha	11549	Western Ghats, 792.48m, 306kms	Bennihalla, Hirehalla, Tasnadi	Karnataka
3.	Bhima	70614	Western Ghats, 945m, 861kms	Combined waters of Mula & Mutha Ghod, Nira,Sina	Maharashtra, Karnataka
4.	Tungabhadra	47866	Western ghats at Gangamula, 1198m, 531kms	Combined waters of Tunga & Bhadra, Varada, Hagari(vedavathy)	Karnataka & Andhra Pradesh
Cauvery River System					
1.	Harangi	717	Pushpagiri Hills of Western ghats, 1,067 metres, 50 km	-	Karnataka
2.	Hemavathy	5410	Ballarayana Durga in Western Ghats, 1,219 metres, 245 km	-	Karnataka
3.	Kabini	7040	Western ghats in Kerala, 2,140 metres, 230 km	Taraka,Hebballa, Nugu, Gundal	Karnataka, Kerala & Tamil Nadu
4.	Suvarnavathy	1787	Nasrurghat Range, Length 88 km.	-	Karnataka & Tamil Nadu
5.	Lakshmanathirtha	1690	Western ghats, 1,950 metres, 131 km.	Ramathirtha	Karnataka
6.	Shimsha	8469	Tumkur district, 914 meters, 221 km.	Veeravaishnavi, kanihalla, chickkhole, Hebbahalla, Mullahalla & Kanva	Karnataka
7.	Arkavathy	4351	Nandidurga 1,480 meters 161 km	Kumaudavat-hy, Manihalla & kuttehole, Vrishabhava-thy	Karnataka & Tamil Nadu
Godavari River System					
1.	Manjra	15,667 Sq.kms - Maharastra, 4,406 Sq.kms - Karnataka, 10,772 Sq.kms -Andhra Pradesh	Balaghat range of hills, 823m	Tirina,Karanja, Haldi,Lendi & Mannar	Maharastra, Karnataka & Andhra Pradesh

West Flowing River System					
1.	Mahadayi/ Mandavi	2032	Western ghats, Belgaum district, 600meters, 87 kms.	Maderi	Karnataka, Goa
2.	Kalinadi	4188	Western ghats, Bidi village, 600 meters, 153 Kms	Pandhari, Tatti-halla and Nagi	Karnataka
3.	Gangavalli (Bedthi)	3574	Western ghats south Of Dharwad 700 meters, 152 kms	-	karnataka
4.	Aghanashini (Tadri)	1330	Western ghats Near Sirsi, 500 meters, 84 kms.	-	Karnataka
5.	Sharavathi	3592	Westren ghats Humacha in Shimoga district, 700 meters, 122 kms	-	Karnataka
6.	Chakra Nadi	336	East of Kodachadri in Shimoga district, 600 meters, 52 kms.	Kollur	Karnataka
7.	Varahi (Haladi)	759	Kavaledur-ga in the Shimoga district, 600 meters, 66 kms	-	Karnataka
8.	Netravathy	3222	Bellarayan-a Durga in the Dakshina Kannada, 1000 meters, 103 km	Gundiahole, Kumaradara and Shisiahole.	Karnataka
9.	Barapole (Valapattanam)	1867	Brahamagiri Ghat Reserve Forest in Coorg , 900 meters, 110 kms	-	Karnataka & Kerala
NORTH PENNAR RIVER SYSTEM					
1.	Uttara Pinakini (North Pennar River)	6937	Nandi hills of Kolar, 597km	Jayamangali, Kumadavathy, Chitravathy and papagni	Karnataka, A ndhra Pradesh
SOUTH PENNAR RIVER SYSTEM					
1.	South Pennar	4370	Nandi hills of Kolar	-	Karnataka, Tamil Nadu
PALAR RIVER SYSTEM					
1.	Palar	2813	Talagavara village in Kolar, 900 meters , 348 kms.	-	Karnataka, Andhra Pradesh Tamil Nadu

Source : Website, Water Resources Department, Karnataka, accessed on 17.03.2011

Annexure 3.c

Organisation Structure, Water Resources Department



Source : Annual report, 2009-10, Water Resources Department

Suggested template for financial Benefit : Cost Analysis and (IRR) Internal Rate of Return.

Financial Benefit : Cost Ratio
A. Annual Benefits
(a) Post-Project
(b) Pre-project
(c) Loss in Agriculture Production (submerged area)
(d) Revenue from water supply
Net Benefits (a) – (b) – (c) + (d)
B. Annual Cost
(a) Interest
(b) Depreciation
(c) Annual O & M
(d) Maintenance of pumping system (Canal if any)
(d) Cost of Power consumed *
C. Notes
Annual Benefits = Gross Value Added from farm produce Less 1. Dung Receipts 2. Expenditure on seeds 3. Expenditure on manure 4. Expenditure on hired labour 5. Fodder expenses (15% of Farm produce) 6. Depreciation of farm implements (2.7% of Farm produce 7. Share and cash rent (5% of Farm produce) 8. Land revenue (5% of Farm produce)
Interest @ 10 percent of project cost (including cost of land development)
Depreciation to include: A) 1% of capital cost (excluding cost of land development) B) 8.33 % of Capital cost of pumping system
Pre-project Details viz. yield, crop production value of crop production, etc., to be provided by the Agriculture Department Post project estimations viz. yield, crop production, value, etc., should be supported with study report and validated by Agriculture Department
Revenue from water supply to include water charges proposed as part of the project
* In case power is availed free or under a subsidized rate, the economic cost of power should be included in the costs
Internal Rate of Return
A. Annual Cost per year from start of project
B. Annual Agricultural benefit per year from start of project
C. Net Present Value (Net benefit)
D. Notes
Annual project cost = Total project cost/no of construction years; Annual cost per year will only be O&M cost once project is completed.
Net benefit = Annual benefit less Annual Cost)
IRR is rate of discount at which the NPV of project is zero

Source : Worked out from Planning Commission guidelines, Technical Advisory Committee guidelines, Report by Ministry of Water Resources, USAID Project Appraisal practitioner's guide, Project Reports; Krishna (Almatti) – Pennar link canal project, Karnataka. Pamba – Achankovil – Vaippar link project, Tamil Nadu.

Annexure 3.e

Details of on-going projects

Sl. No.	Project	Zone	Year of Commencement	Agency/ Corporation	Ultimate Irrigation Potential		Taluk/District	Original Estimated Cost (₹ Lakhs)	Revised Project Cost as on Mar 2010 (₹ Lakhs)	Programme for 2009-10 (₹ Lakhs)	Financial progress upto date (Mar 10)	Physical progress upto date (Mar 10)
					Area (In Hectares)	(In TMC)						
ALL BASINS					**2530533**	**753**		**507879**	**2631299**	**207920**	**89%**	**81%**
I	**KRISHNA BASIN**				**1945427**	**552**		**489334**	**1951254**	**161449**	85%	83%
A	**MAJOR:**				**1893175**	**540**		**472565**	**1838017**	**152051**	**85%**	**83%**
	1.	Upper Krishna Project Stage I & II	KBJNL	1969	KBJNL	622200	173	Bijapur/Bagalkote / Raichur/Gulbarga/ Koppal.	357383	1085139	81859	95%	97%
	2.	Ghataprabha-III	Irrigation (North)	1972	KNNL	331000	78	Belgaum & Bijapur (* Indicates inclusive of I & II stage)	9054	143500	16629	103%	96%
	3.	Malaprabha	Irrigation (North)	1960	KNNL	218191	44	Belgaum Bagalkot & Dharwad	16209	138348	12500	92%	97%
	4.	Upper Tunga	Upper Tunga Prject	1991	KNNL	94700	12	Shimoga, Davangere ,Haveri	27140	105288	7500	102%	27%
	5.	Hipparagi	Irrigation (North)	1973	KNNL	59690	13	Belgaum & Bijapur	18670	152178	22050	31%	20%
	7.	Singatlur	Irrigation Central Zone	1992	KNNL	20241	8	Mundargi/ Huvinahadagali/ Koppal	6362	65700	3500	35%	0%

	9.	Markendeya	Irrigation (North)	1998	KNNL	19105	4	Belgaum	12000	34184	565	90%	75%
	10.	Dudhganga	Irrigation (North)	1992	KNNL	15167	4	Chikkodi/Belgaum	12400	30980	1670	42%	25%
	11.	Bhadra	Upper Tunga Project	1947	WRD	105570	62	Shimoga, Chitradurga, Chikkamaglur & Bellary	3353	17000			100%
B	**MEDIUM :**					**52252**	**12**		**16769**	**113237**	**9398**	**88%**	**79%**
	1.	Amarja	Irrigation Projects Zone	1975	KNNL	8903	2	Aland & Afzalpur/Gulbarga	570	21945	3000	79%	25%
	2.	Lower Mullamari	Irrigation Projcts Zone	1975	KNNL	8100	2	Chincholi/ Gulbarga	4500	21000	2500	91%	96%
	3.	Gandhorinala	Irrigation Projects Zone	1993	KNNL	8094	2	Gulbarga	6600	23900	2550	97%	98%
	4.	Harinala	Irrigation (North)	1998	KNNL	3480	1	Bailahongal/ Belgaum	2695	7300	200	91%	86%
	5.	Basapura lift	Upper Tunga Prject	1993	KNNL	2276	1	Hangal/Haveri	455	2696	400	51%	39%
	6.	Itagi Sasalvad lift	Upper Tunga Prject	1994	KNNL	2013		Shirahatti/Gadag	427	1855	400	104%	100%
	7.	Hirehalla	Irrigation Central Zone	1977	WRD	8330	2	Koppal/Raichur	635	27200	216	85%	97%
	8.	Maskinala	Irrigation Central Zone	1976	WRD	3001	1	Lingsugur/Raichur	311	4835	132	106%	100%
	9.	Upper Mullamari	Irrigation Projects Zone	1976	WRD	3279	1	Basavakalyana/ Bidar	328	2258		100%	100%
	10.	Hodirayanhalla	Upper Tunga Project	1987	WRD	1538		Tarikere/ Chikmagalur	248	248		81%	47%

II	**CAUVERY BASIN**					**529743**	**173**		**16612**	**569885**	**30200**	107%	79%
A	**MAJOR :**					**487766**	**154**		**11548**	**536510**	**26302**	**99%**	**78%**
	1.	Hemavathy Tumkur	Hemavathy Canal	1968	CNNL	157755	57	Tumkur/Mandya (* inclusive of water supply)	1630	212600	8074	62%	75%
	2.	Hemavathy Gorur	Dam Zone	1968	CNNL	132479		Hassan/Mandya/ Mysore/Tumkur/ Coorg	1630	175100	4080	89%	99%
	3.	Kabini	Irrigation (South)	1959	CNNL	87900	65	Mysore	320	39000	7189	166%	47%
	4.	Harangi	Irrigation (South)	1964	CNNL	53591	17	Coorg/Hassan/ Mysore	1100	54500	1811	102%	98%
	5.	D.D.Urs Canal	Irrigation (South)	1979	CNNL	32376	11	Mysore/Mandya	1850	5810	987	803%	98%
	6.	Yagachi	Hemavathy Reservoir Project	1983	CNNL	21450	6	Alur,Belur,Hassan, Holenarsipura/ Hassan	3538	44000	3122	70%	20%
	7.	K.R.S.Modern isation	Irrigation (South)	1979	CNNL	2215		Mysore/Mandya	1480	5500	1039	779%	100%
B	**MEDIUM :**					**41977**	**18**		**5064**	**33375**	**3899**	**243%**	**88%**
	1.	Votehole	Hemavathy Reservoir Project	1977	CNNL	7487	2	Alur,Belur/Hassan	205	5975	58	103%	100%
	2.	Taraka	Irrigation (South)	1970	CNNL	7040	4	H.D.Kote	170	5100	120	123%	100%
	3.	Uduthorehalla	Irrigation (South)	1978	CNNL	6597	1	Kollegal	755	3230	148	703%	94%
	4.	Arkavathy	Irrigation (South)	1975	CNNL	6232	3	Kanakapura	2225	2225	2110	784%	98%

	5.	Iggalur	Irrigation (South)	1979	CNNL	4047	5	Channapatna, Maddur, Malavalli	342	1075	261	761%	98%
	6.	Kamasamudra L.I.S	Hemavathy Reservoir Project	1985	CNNL	3916	1	Holenarsipura/ Hassan	100	7000	220	79%	7%
	7.	Huchannakoplu L.I.S	Hemavathy Reservoir Project	1991	CNNL	3360	1	Holenarsipura/ Hassan	690	5000	820	89%	100%
	8.	Manchanabele	Irrigation (South)	1970	CNNL	2433		Magadi & Ramanagar	237	1850	162	467%	100%
	9.	Chicklihole	Irrigation (South)	1978	CNNL	865	1	Somwarpet	340	1920		100%	100%
III	**GODAVARI BASIN**					**39661**	**11**		**990**	**53200**	**1271**	92%	78%
A	**MAJOR :**					**35614**	**10**		**990**	**53200**	**1271**	92%	78%
	1.	Karanja	Irrigation Projects Zone	1970	WRD	35614	10	Bidar	990	53200	1271	92%	78%
B	**MEDIUM :**					**4047**	**1**						
	2.	Chulkinala	Irrigation Projects Zone	1976	WRD	4047	1	Basavakalyan, Bhalki/bidar					
III	**OTHER BASINS**					**15702**	**17**		**943**	**56960**	**15000**	58%	2%
	1.	Varahi	Upper Thunga Project	1980	KNNL	15702	17	Kundapura,Udupi	943	56960	15000	58%	2%

Source : List of projects taken from http://waterresources.kar.nic.in/ongoing.htm updated as on 22.10.2010 and accessed 17.03.2011; Status of projects for cost and physical progress taken from Performance Budget 2009-10, Water Resources Department (Major and Medium Irrigation), Government of Karnataka, and Annual report, 2009-10, Water resources Department (Major and Medium irrigation).

Details of completed projects

SL. NO.	NAME OF THE PROJECT	YEAR OF COMPLETION	UTILISATION. IN TMC	IRRIGATION IN HA	EXPR. (₹ LAKHS)	DISTRICTS BENEFITTED
A	**MAJOR PROJECTS**					
1.	**KRISHNA BASIN**					
1.	Ghataprabha I & II	1980	32.45	139383	7226	Belgaum, Bijapur
2.	Tunga Anicut	1956	11.5	8704	331	Shimoga
3.	Tungabhadra R.B.L.L.C.	1986	22.5	37504	453	Bellary
4.	Vanivilas Sagar	1908	8.2	9190	45	Chitradugra
5.	Vijayanagar Channels	1600	12.05	12210	NA	Bellary, Raichur
	Total I (A)		86.7	206991	8055	
II.	**CAUVERY BASIN**					
1.	Anicut Channels	1900	57.7	77172	NA	Bangalore, Hassan, Kodagu
2.	Krishnaraja Sagar	1944	61.2	79312	693	Mandya, Mysore
3.	Nugu	1959	7.7	10526	315	Mysore
	TOTAL II (A)		126.6	167010	1008	
	TOTAL A :		**213.3**	**374001**	**9063**	
B	**MEDIUM PROJECTS**					
1	**KRISHNA BASIN**					
1.	Ambligola	1964	1.4	2955	116	Shimoga
2.	Anjanapura	1936	2.5	6736	21	Shimoga
3.	Areshankar	1957	0.38	1255	22	Bijapura
4.	Bhadra Anicut	1923	3.1	4466	Na	Chickmagalur
5.	Chandrampalli	1972	1.9	5223	185	Gulbarga
6.	Chitwadgi	1971	0.26	891	41	Bijapur, Raichur
7.	Dharma	1964	2.2	5668	133	Dharwad, uttara Kanada
8.	Gayatri	1963	0.45	2305	40	Chitradurga
9.	Gokak Canal	1897	1.4	5757	NA	Belgaum
10.	Hagaribommanahalli	1978	2	2966	395	Bellary
11.	Hathikoni	1973	0.5	2145	84	Gulbarga
12.	Jambadhalla	1968	0.7	1538	115	Chickmagalur
13.	Kalaskop	1960	0.33	1143	20	Bijapur
14.	Kanakanala	1975	0.4	2064	100	Raichur
15.	Kolchi Weir	1953	0.53	1275	43	Belgaum
16.	Nagathana	1961	0.08	650	15	Bijapur
17.	Narayanapur	1961	0.6	1624	34	Chitradurga
18.	Narihalla	1979	0.9	1512	320	Bellary
19.	Rajolibanda	1960	1.2	2380	52	Raichur
20.	Ramanahalli	1958	0.44	1943	42	Bijapur
21.	Soudgar	1987	0.26	1417	557	Gulbarga
	Total (B) I :		21.53	55913	2335	

II	**CAUVERY BASIN**					
1.	Byramangala	1945	1	1619	NA	Bangalore
2.	Chikkahole	1969	0.7	1650	424	Mysore
3.	Gundal	1980	1.4	4048	452	Mysore
4.	Hebbala (H.D. KOTE)	1972	0.4	1214	54	Mysore
5.	Kanwa	1946	1.2	2076	35	Bangalore
6.	Mangala	1970	0.6	850	60	Tumkur
7.	Marconahalli	1941	4	4560	35	Tumkur
8.	Nallur Amanikere	1987	0.3	1300	517	Mysore
9.	Suvarnavathy	1984	3.6	2833	381	Tumkur
	TOTAL (B) II		13.2	20150	1958	
III.	**OTHER BASINS**					
1.	Bachanki	1974	0.52	1776	37	Uttara Kannade
2.	Teetha	1987	0.36	1214	373	Tumkur
	TOTAL (B) (iii)		0.88	2990	410	
	TOTAL B :		35.61	79053	4703	
	TOTAL (A + B)		**248.91**	**453054**	**13766**	

Source : List of completed projects updated as on 22.10.2010, Website, Water Resources Department, accessed on 17.03.20

Project Details, Selection methodology, Reasons for Delays (Selected Projects)

Project	Selection methodology	Implementation mechanism	Reasons for Delays (if any)
KBJNL Projects			
Upper Krishna Project/ Almatti Dam	1. Conducted feasibility studies 2. The cost benefit ratio was worked out 3. Adopted economical design and safety infrastructure	Mid way correction measures	1. Land acquisition 2.Objection from the farmers 3. Modification in design and drawings. 4.Change in the design and drawings as per actual site condition
Rajankollur LIS	1. Carried out detailed survey and investigation studies 2. Cost benefit ratio is worked out (2:1)	Mid way correction measures	1.Delay in the process of land acquisition 2.Ill health of the contractor
CE canal Zone	Feasibility studies were undertaken by the Project Authorities in terms of cost Benefit Ratio.	_	1.Obstruction be the land owners demanding compensation 2. Delays due to rains
KNNL Projects			
Bhima Lift Irrigation Scheme	1. Physical & financially feasibility investigations were made 2.Cost Benefit Ratio Method	As per the KTTP Act and KNNL Circulars	1.Land Acquisition problems 2.Approval of R & R Package 3. Unexpected rains and Heavy floods
BNT Project Divn, Hebbal		As per the KTTP Act and KNNL Circulars	1. Land acquisition 2. Due to Rains
Amarja Project, cleared from Planning commission in the year 1978.	Cost Benefit Ratio Method	As per the KTTP Act and KNNL Circulars	1.Land Acquisition Unexpected heavy rain & floods 2.Technically needed works
Gandorinala Project, cleared from Planning commission in the year 1978.	Cost Benefit Ratio Method	As per the KTTP Act and KNNL Circulars	1.Land Acquisition Unexpected heavy rain & floods. 2.Technically needed works
Lower Mullamari Project Division NO-3	Cost Benefit Ratio Method	As per the KTTP Act and KNNL Circulars	1.Land Acquisition 2.Unexpected heavy rain & floods. 3.Technically needed works

Malaprabha Project 4701 Capital	Feasibility studies were conducted, cost benefit ratio	Competitive bids are invited from registered contractors in PWD & Irrigation agencies	Because of land acquisition problem the work could not be kept in progress as per Schedule
Upper Bhadra Project	Feasibility studies were conducted	1. Mid way correction measures. 2. As per the KTTP Act and KNNL Circulars	1. Delay in getting statutory clearances at various stages like EC, F.C & CWC, etc. 2. Land Acquisition Problems 3. Obstruction of works by the local people & nature
Varahi Irrigation Project	The Preliminary survey works were carried by using Ariel maps of project area.	As per the KTTP Act and KNNL Circulars	1.Reserve forest tree clearance 2.Govt. land release 3.Private land acquisition
CNNL projects			
Kabini	Feasibility study was undertaken by conducting detailed survey before commencement of the project.	There is an existing quality control organisation looking after the quality aspects of the works through physical monitors.	1. Land acquisition problem 2. Cost escalation 3. Non availability of fund in time.
Taraka	Feasibility study was undertaken by conducting detailed survey before commencement of the project.	The physical and financial progress were monitered regularly by conducting monthly review meetings and regular inspection of workspots.	The construction of the various components of the projects was delayed due to Land acquisition/fund problems.
Manchanabele Reservoir Project			1.Due to shortfall in yield, the contemplated original atchkat has been curtailed. 2.Due to Geological condition positions, spillway is shifted & No. of gates has been reduced from 4 to 3.
Arkavathi	Cost benefit ratio is worked out	As per KTTP Act	The project was delayed due to delay in the process of land acquisition, Paucity of funds & due to the problems in site conditions

Iggalur Barrage Project	1. Design conditions has been considered during execution and implementation of the project. 2.Then prevailing methods were adopted to make assessment	As per the records then prevailing technologies of construction were adopted. The then prevailing methods were adopted to make assessment	Time line was delayed due to land acquistion problems, Paucity of funds & due to the problems in site conditions
Hemavathi project - Gorur	Feasibility study was undertaken by conducting detailed survey before commencement of the project.		1. The project was delayed due to Land acquisition/fund problems. 2. The construction schedule has been drawn and due to various constraints implementation of the project is delayed. 3. Change in the scope of the project including Lift Irrigation Schemes in the project. 4. Required funds were also not made available.

Source : iDeCK

Statement showing the department-wise outstanding Inspection Reports (IRs).
(Referred to in paragraph 4.22)

Sl. No.	Name of the Department	No. of PSUs	No. of outstanding I.Rs.	No. of outstanding paragraphs	Year from which outstanding
1	Agriculture and Horticulture	7	10	64	1999-2000
2	Animal Husbandry, Fisheries and Forest	5	9	53	1997-1998
3	Commerce and Industries	30	66	389	1996-1997
4	Co-operation	1	2	20	2006-2007
5	Energy	8	250	1165	1994-1995
6	Finance	5	11	92	1998-1999
7	Food and Civil Supplies	1	4	22	2000-2001
8	Home and Transport	5	81	349	1999-2000
9	Housing	1	3	21	2002-2003
10	Urban Development	1	2	16	2004-2005
11	Information, Tourism and Youth Services	4	9	34	1996-1997
12	Water Resources	3	451	1220	1984-1985
13	Public Works	2	6	23	2002-2003
14	Rural Development and Panchayat Raj	1	3	44	2001-2002
15	Social Welfare	4	11	55	1999-2000
16	Information and Technology	1	1	22	2007-2008
	Total	**79**	**919**	**3589**	

Source : Audit Report (Commercial) for the year ended 31 March 2009

Annexure 3.i

Irrigation Potential Details and Area Notified, KBJNL

Name of the Canal	Planned Command Area	Potential already created	Notified Area for Rabi 2010	FIC programme for 2010-11	FIC Pgress during 2010-11 upto Dec, 2010.
1	2	3	4	5	6
UKP STAGE-I & II					
Stage-I					
Narayanpur Left Bank Canal	47,223	50,134	50134	0	0
Shahapur Branch Canal	1,22,120	1,11,005	1,00,345	1,048	545
Mudbal Branch Canal	51,000	45,015	41,885	0	0
Indi Branch Canal	1,31,260	1,31,293	1,23,414	206	206
Jewargi Branch Canal	57,100	58,778	54,618	3,000	0
Almatti Left Bank Canal (KM 1-67)	16,200	19,893	19,705	289	196
Total for Stage - I	**4,24,903**	**4,16,118**	**3,90,101**	**4,543**	**947**
Stage-II					
Narayanapur Roght Bank Canal	84,000	90,839	87,341	8,672	5,161
Almatti Left Bank canal (KM77.00 to 91.115	4,035	3,895	0	2,856	0
Almatti right Bank Canal	16,100	9,222	8,940	58	0
Mulwad Left Irrigation Scheme	30,850	22,000	20,505	193	152
Rampur Left Irrigation Scheme	20,235	19,406	18,831	1,410	931
Indi Lift Irrigation Scheme	41,900	43,400	39,897	2,333	1,566
Total for Stage-II	**1,97,120**	**1,88,762**	**1,75,514**	**15,552**	**7,810**
Total for Stage-I & Stage-II	**6,22,023**	**6,04,880**	**5,65,615**	**20,065**	**8,757**
OTHER PROJECTS					
Ramhtal LI Scheme	26,200	1,030	333	804	204
sonna LI Scheme	1,000	900	456	834	504
Rajankollur LI Scheme	1,030	1,000	0	1,110	354
Itaga-Sangam Li Scheme	300	300	0	288	80
ILC (KM 97.30 onwards)	11,800	578	0	3,291	0
Total for Other projects	**40,330**	**2930**	**789**	**6,327**	**1,142**
Grand Total	**6,50,253**	**6,07,810**	**5,66,404**	**26,392**	**9,899**

Source : KBJNL

Annexure 3.j

Details of Budget allocation and expenditure for Command Area Development Authority (CADAs)

Sl. No.	Name of CADAs with Headquarters	Budget Allocation for 2009-10 (₹ Lakhs)	Expenditure for 2009-10 (₹ Lakhs)	Expenditure (percent)	Irrigation Projects	Year of Starting	Districts covered
1.	Malaprabha and Ghataprabha, Belgaum	1195	1009	84%	Malaprabha and Ghataprabha	1974	Belgaum, Dharwad, Bagalkot, Gadag
2.	Tungabhadra Project, Munirabad	1056	981	93%	Tungabhadra, Hirehalla, Maskinala	1974, 1979	Bellary, Raichur and Koppal
3.	Upper Krishna Projects, Bheemarayanagudi	1166	860	74%	Upper Krishna	1977, 1979	Gulbarga, Bijapur, Raichur and Bagalkot
4.	Cauvery Basin Projects, Mysore	900	863	96%	Kabini, Harangi, Hemavathy, KRS, Nugu, Taraka, Gundal, Votehole, Marconahally, Manchanabele, Kanva and Byramangala.	1974	Mysore, Kodagu, Chamarajnagar, Hassan, Mandya, Tumkur, Bangalore (Rural)
5.	Bhadra Reservoir Project, Shimoga	1426	1390	97%	Tunga, Bhadra and Gondi	1979	Shimoga, Chikkamagalore, Davangere
6.	Irrigation Project Zone, Gulbarga	1477	1011	68%	Chandrampalli, Hattiguni, Soudagar, Upper Mullamari, Amarja, Bennethora, Bhima, Gandorinala, Kagna, Karanja	2000	Gulbarga, Bidar
7.	CADAs Secretariat	33	17	53%			
8.	WALMI	170	128	76%			
9.	Water User Co-operative Societies	1					
10.	Special Development Plan	2500	2189	88%			
	Total	9924	8448	85%			

Source : Performance Budget 2009-10, Water Resources Department, Government of Karnataka, June 2010

Comparison of Water Rates for Irrigation of selected states

		Andhra Pradesh	**Karnataka**	**Maharashtra**
Agricultural Water use Rates* in ₹ /ha	*Date of Enforcement*	July 1996	July 2000	Jul 2003
Paddy	*Max*	494	247.1	476
	Min	370.5		119
Sugarcane	*Max*	NA	988.45	6297
	Min			
Cotton	*Max*	NA	148.25	1924
	Min			724
Oilseeds	*Max*	247	148.25	1438
	Min			476
Non Agriculture Water Use Rates in ₹ /KL	*Date since applicable*	Apr-02	Jul-00	Apr-10
Industrial Water	*Min*	0.33	0.06	2
	Max	98.99	0.11	72
Domestic Water Rate	*Min*	NA	0.01	0.26
	Max		0.01	1.01
Revenue Assessed (in ₹ Crore)	*2007-08*	284	69	674
Revenue Realized (in ₹ Crore)	*2007-08*	69	20	627
Revenue Realized/Revenue Assessed (in percent)	*2007-08*	*24*	*29*	*93*

NA : Not Available; Agriculture water use Rates in Andhra Pradesh have been converted into ₹ /ha from ₹ /gallon; (1 gallon(UK) = 4.54609 Litres); Rates for Industrial use in Karnataka are converted into ₹ /KL from ₹ /cft; (1 cubic foot = 28.316847 litres); Sources : Pricing of water in public system in India, 2010, Central Water Commission report, 2010,

*As per Karnataka Irrigation (Levy of Water rates) Rules made by Government of Karnataka under Notification No. WRD16 NPC 99(P) dated 9th October 2002 - In respect of water supplied or made available to Water User Societies for purpose of irrigation by Government or Nigam, water rate shall be levied on volumetric basis at rate of ₹ 12 per cum (or ₹ 12/KL since 1 cubic metres = 1000 litres)

Extracts - State Water Policy

In tune with National Water Policy and as suggested in the said policy GoK enacted State Water Policy during January 2002. The objectives of State Water Policy are as follows:

- Provide drinking water at the rate of 55 liters per person per day in the rural areas, 70 liters per person per day in towns and 100 liters per person per day in the city municipal council areas and 135 liters per person per day in city corporation areas.
- Create an ultimate irrigation potential of 45 lakh hectares under major, medium and Minor Irrigation project. Facilitate creation of an additional irrigation potential of 16 lakh hectares by individual farmers using ground water.
- Improve performance of all water resources projects.
- Improve productivity of irrigated agriculture by involving users in irrigation management.
- Harness the Hydropower potential of the State.
- Provide a legislative, administrative and infrastructural environment, which will ensure fair, just and equitable distribution and utilization of the water resources of the State to benefit all the people of the State.

The State Water Policy also highlights following issues:

- Participatory Approach to Water Resources Management
- Improving Agricultural Production and Farm Incomes
- Restructuring of Water Resources Department
- Water Rights
- Governance
- Private Sector Participation
- Water Rates
- Removal & Prevention of Encroachments
- Catchment and command Area Treatment
- Ground Water Recharge
- Costal Management Plan
- Rain Water Harvesting and Water Conservation
- Ecology
- Disaster Management
- Mini Hydel Schemes
- Monitoring
- Training

- Research
- Eco-Tourism

For implementing the State Water Policy, following action agenda is indicated in the policy document:

1. Formulate and implement project and schemes of rainwater harvesting and recharging of underground water sources, with community participation.

2. Establish State Water Resources Board. Complete review of existing policies and formulate new policies. Review existing legislative framework, draft new legislation and propose amendments to existing legislative framework within 12 months, in order to achieve the objectives enumerated in the policy document.

3. Undertake and complete rehabilitation and development of all Minor Irrigation Tanks on the basis of participation by water-users including farmers, within a period of 10 years and entrust these works and also subsequent operation and maintenance with Tank Users Associations which will themselves regulate water use, cropping pattern, levy and collection of water-user charges.

4. Establish Water Resource Data Information Center and collaborating arrangements with concerned Department/Agencies. Develop protocols for data sharing and exchange. Establish direct access by water management units to water resource Data center's databases and decision support systems like GIS and MIS. Make water accounting and audit mandatory.

5. Restructure the Water Resources Department to improve planning and management capabilities, eliminate multiplicity of functions, increase efficiency of plan and non-plan expenditure, train and redeploy staff based on needs, change operating rules to ensure transparency and accountability and make the Department responsible to user's needs.

6. Assess overall water resource, availability, current and future problems and conflicts and identify drought and flood risk zones in each river basin.

7. Mobilize community and stakeholder participation through Users Organizations, empower them, provide training, technical support and create public awareness. Form and empower Water-User Co-operative Societies and Federations for Participatory Irrigation Management.

8. Develop integrated, conjunctive basin management plan using participatory approach.

9. Develop plans for modernization and rehabilitation of water resources projects as well as reclamation of water logged and salt affected lands and implement them.

10. Restructure and strengthen training, Research and Development Institutions in the water sector to meet technology requirements, to support basin planning, participatory approaches and render technical assistance to user organizations.

Source: iDeCK

Strategies for improving irrigation efficiency and measures for efficient irrigation water delivery

General Strategies	**1.** Standardized definition of irrigation efficiencies need to be evolved, a basin efficiency concept which integrates all surface water and ground water uses as well as reuse and recirculation is important. The basin efficiency needs to be estimated along with project related efficiencies. **2.** Conjunctive use of water to be given higher priority as means of improving water use and basin efficiency, policy of selective lining of canals should be continued. Low water allowances and inadequate conveyance capacities lead to better efficiencies and less water logging related problems and should be encouraged. **3.** Memorandum of Understanding (MoU) with Water Users' Association (WUAs) should include standard clause which binds users for effective conjunctive use of surface and ground water. On continuous rise of ground water table, the MoU should allow the department to cut surface water supply **4.** Minor Irrigation tanks, minor surface lifts in command should be integrated with major project works **5.** Irrigation authorities should prepare water budget accruing for all water stored, diverted, all losses, all reuse of lost waters, estimated evaporation etc. **6.** Creation of Irrigation Maintenance Corporation as provided in the Irrigation management policy for linkage between revenues from water and O&M funds. **7.** Operation & Maintenance budget to be decided in consultation with farmers **8.** All Schemes more than 25 years old should be studied in detail for structural safety and performance **9.** Drip/Sprinklers may be encouraged for crops other than horticulture/vegetable crops and storage creation for such supply need to be ensured **10.** Automation should be introduced for water stressed areas to economize the use of ground water
Target efficiency of water delivery system	**1.** Target Efficiency should be defined for each project and any performance evaluation should be compared to target efficiency **2.** Conveyance Efficiency = Volume of water delivered as ratio of distribution to water drawn from canal head) and Distribution efficiency **3.** Distribution efficiency = Volume of water delivered to field as ratio of water drawn from distribution
Timely and equitable distribution of water	**1.** Replace cross regulators and head regulators with proportionate distribution system such that any reduction in flow in parent channel will automatically cause proportionate reduction in withdrawal in secondary system. **2.** Install MIS-DSS as a reliable automatic control system to aid decision making for timely distribution of water with equity **3.** Institutional support is required to be provided for Participatory Irrigation Management for better equity in distribution of water

Increasing production per unit and per unit volume of water used	**1.** Modernization of tertiary canals with controls, restoration of traditional water bodies, promotion of water harvesting, decentralized water control, micro irrigation with fertigation, etc., need be considered
Bridging gap between potential created and potential utilized	**1.** Reliable and accurate system of assessment of potential created and utilized should be introduced, remote sensing can be effectively utilized, a coordinating statistical organisation in each state should be introduced. **2.** Regulatory mechanism should be brought into practice to discourage undesirable or unsuitable crops and to deter over exploitation of ground water beyond allowable limit **3.** Night irrigation should be introduced in policy and practice
Financial sustainability of water delivery infrastructure	**1.** Revision of water rates should go hand in hand with measures to improve quality of services **2.** There should be a two part tariff a) flat annual rate on per hectare basis and b) variable rate linked to actual expenditure on service **3.** Rationalization of water rates, meeting O&M through water rates, reducing salary component in O&M costs

Source : Report on working group on water resources for XI five year plan (2007-2012), Ministry of Water resources, Government of India, 2006.

Decadal Growth of Urban Population in Karnataka

Year	Number of Towns	Total Population	Urban Population	Percentage of urban to total population	Percentage decadal growth rate
1	2	3	4	5	6
1901	215	1,30,54,754	16,39,900	12.56	-
1911	180	13,525.25	15,63,772	11.56	-4.64
1921	193	1,33,77,599	18,40,687	13.76	17.71
1931	210	1,46,32,992	22,39,134	15.3	21.65
1941	207	1,62,55,365	27,53,967	16.94	22.99
1951	285	1,94,01,956	44,53,480	22.95	61.71
1961	213	2,35,86,772	52,66,493	22.33	18.26
1971	227	2,92,99,014	71,22,093	24.31	35.23
1981	250	3,71,35,714	1,07,29,606	28.29	50.65
1991	254	4,48,00,468	1,38,50,702	30.91	29.09
2001	237	5,27,33,958	1,79,09,858	33.98	28.85

Source : Census, 2001 (Taable:2)

District-wise projected population and Land requirement for Urbanization 2025

Sl No.	District	Projected Population – 2025			Urban Land Requirement -2025	
		Total	Urban	% Urban Pop.	(In Ha.)	% of geo. Area
1	2	3	4	5	6	7
1	Bangalore Urban	8867262	8867262	100.00	74152	33.86
2	Bangalore Rural	3071010	1726817	56.23	18723	3.22
3	Belgaum	6482302	2280957	35.19	38152	2.84
4	Bellary	3052720	986869	32.33	37395	4.44
5	Bidar	2311433	817307	35.36	11900	2.18
6	Bijapur	2884679	1025084	35.54	27301	2.61
7	Bagalkot	2502205	856727	34.24	9422	1.43
8	Chickmagalur	1877778	663010	35.31	12581	1.75
9	Chitradurga	2421502	873711	36.08	9796	1.17
10	Chamrajnagar	1628149	589237	36.19	9984	1.76
11	Davangere	2874040	974297	33.9	13505	2.24
12	Dharwad	2986638	828219	27.72	32831	7.76
13	Dakshina Kannada	2867739	946553	33.01	23108	4.77
14	Gulbarga	4888499	1684471	34.46	25851	1.59
15	Gadag	1583865	526495	33.24	36349	7.81
16	Hassan	3028034	1034700	34.17	13916	2.04
17	Haveri	2015563	742645	36.85	11800	2.43
18	Kolar	4085680	1445886	35.39	18345	2.23
19	Koppal	1767172	626694	35.46	9303	1.1
20	Kodagu	894476	333701	37.31	5714	1.39
21	Mandya	3032425	1127951	37.2	11625	2.34
22	Mysore	4197005	1382897	32.95	17881	2.85
23	Raichur	2490389	877342	35.23	16992	3.06
24	Shimoga	2677267	870808	32.53	16312	1.93
25	Tumkur	4248145	1539301	36.23	17531	1.65
26	Udupi	2118646	727793	34.35	26920	7.48
27	Uttar Kannada	2249426	788854	35.07	19895	1.93
	State	83104049	35145588	42.29	567284	2.96

Source : Urban Development Policy (Table:6)

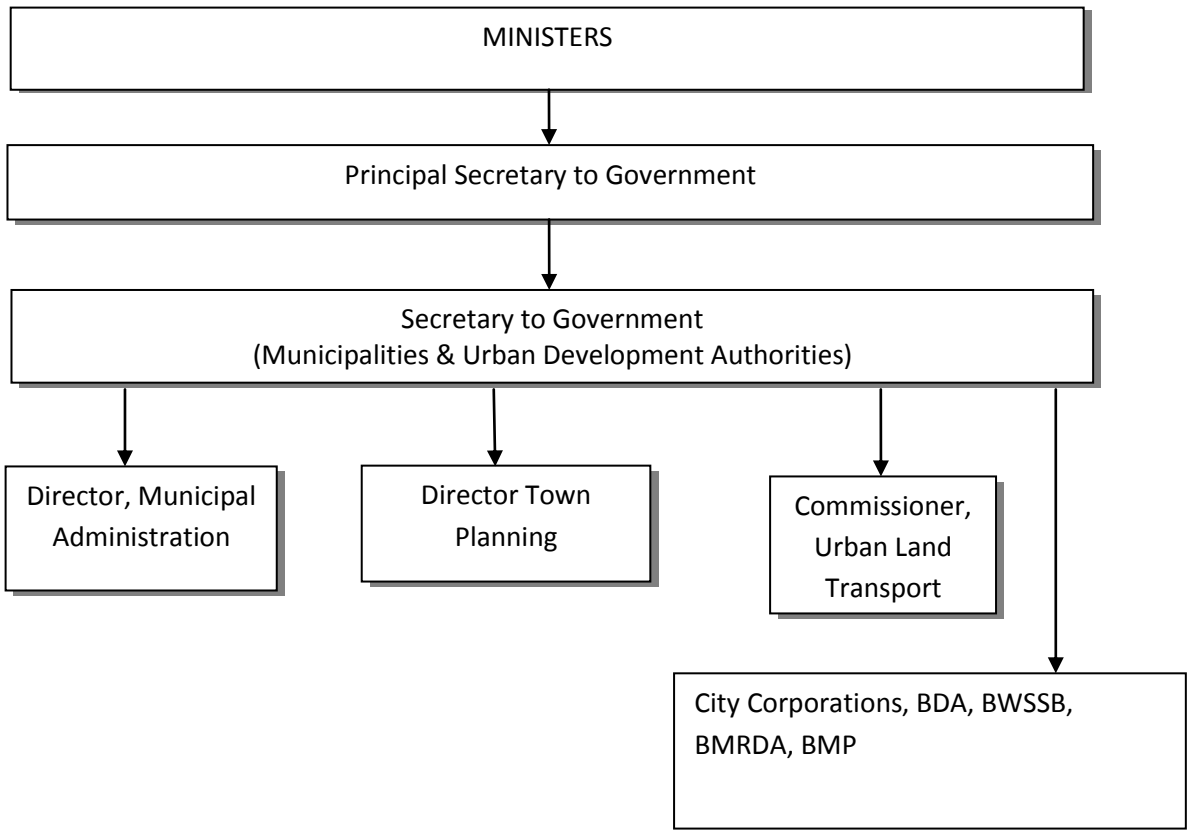
Annexure 4.b

Details of Urban Roads in few selected states in India

Description	As on	Karnataka	Maharashtra	Gujarat	Tamil Nadu	Andhra Pradesh	Kerala
Total length of urban roads (kms)	*31-03-08*	24070	20383	19306	17559	13799	13289
Total length of surfaced urban roads (kms)	*31-03-08*	15418	15159	15002	14788	10950	10868
Percentage of Surfaced road length with respect to Total Urban road length	*31-03-08*	64%	74%	78%	84%	79%	82%
Total Urban Population (Nos)	*Census 2001*	1,79,61,529	4,11,00,980	1,89,30,250	2,74,83,998	2,08,08,940	82,66,925
Urban Area (sq. km)	*Census 2001*	5201	7356	5227	12525	4727	3252
Length of Urban roads/ '000 population		1.3	0.5	1.0	0.6	0.7	1.6
Length of Surfaced Urban roads/population		0.9	0.4	0.8	0.5	0.5	1.3
Length of Urban roads/area		4.6	2.8	3.7	1.4	2.9	4.1

Source : Basis road statistics of India, Government of India, Ministry of Road transport and highways, Transport research wing, New Delhi, July 2010.; Census 2001; Report on Indian Urban Infrastructure and Services, The High Powered Expert Committee (HPEC) for
Estimating the Investment Requirements for Urban Infrastructure Services, March 2011.
Note : Since population are for 2001, Length of roads are as on 31 March 2008, there will be some variation in road length per population

Organisation Chart – Urban Development Department



Karnataka Urban Service Level Benchmarking for 213 ULBs in the State (Other than Bangalore)

Reporting Period:2009-2010				Median		Highest		Lowest	
Sl. No.	**Description**	**Total**	**Mean**	**ULB Name**	**Value**	**ULB Name**	**Value**	**ULB Name**	**Value**
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
I	**General Information Report for the State**								
1.	Population as per 2001 Census	1,16,09,873.00	55,816.70	Malur	27,815.00	Mysore	7,87,179.00	Shringeri	4,249.00
2.	Urban Area as per 2001 Census in Sq. Km.	4,258.44	20.47	Manvi	2.45	Hubli Dharwad	213.42	Yelandur	0.43
3.	Present Area in Sq. Km.	4,115.31	19.41	Kudachi	4.00	Hubli Dharwad	202.30	Saragur	0.48
4.	No. of House Holds as per 2001	22,72,508.00	10,925.52	Navalgund	4,051.00	Mysore	1,65,815.00	Hosanagara	1,078.00
5.	No. of Wards	5,071.00	23.81	Moodabidri	23.00	Hubli Dharwad	67.00	Alur	11.00
II	**Service Level Benchmarking:Disease Control Report for the State**								
6.	No. of vector borne disease cases reported	6,234.00	84.24	Hukkeri	3.00	Maddur	1,314.00	Channagiri	1.00
7.	No. of water borne disease cases reported	6,880.00	101.18	Hiriyur	12.00	Gulbarga	1,209.00	Badami	1.00
III	**Disease Control Indicator Report for the State**								
8.	Number of Vector borne disease cases (per 1000)		0.11	Harappanahalli	0.01	Maddur	3.15	Badami	0.01
9.	Number of water borne disease cases (per 1000)		0.14	Hiriyur	0.02	Channarayapatna	1.19	Belgaum	0.01
IV	**Municipal Finance Indicator Report for the State**								
10.	Per capita gross own revenue receipts (₹)		124.73	Chincholi	14.00	Afzalpur	12,172.00	Gubbi	1.00

(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
11.	Per capita tax receipts (₹)		453.69	Devadurga	29.00	Afzalpur	59,377.00	Bhalki	1.00
12.	Per capita own non tax receipts (₹)		51.36	Chintamani	29.00	Koppa	876.00	Kundagol	1.00
13.	Per capita expenditure (₹)		95.07	Holalkere	48.00	Malur	1,154.00	Bijapur	1.00
15.	Income per Employee (₹)		145.83	Holenarsipura	36.00	Afzalpur	16,531.00	Aurad	1.00
16.	Expense per Employee (₹)		237.39	Tarikere	193.00	Mudhol	1,377.00	Chikkaballapur	2.00
V	**Development of Parks & Gardens Indicator Report for the State**								
17.	% of area under parks and gardens		0.54	Mulgund	0.01	Yadgir	9.98	Belthangadi	0.01
VI	**Roads,Road side drains & Street lights Indicator Report for the State**								
18.	Operation and Maintenance cost per street light (₹)		1,396.29	Haveri	429.00	Malur	11,201.00	Shahapur	55.00
19.	Incidence of water logging and flooding (₹)	13,484.00	102.93	Konnur	100.00	Bhatkal	1,000.00	Bantwal	10.00
20.	Efficiency in redressal of customer complain		94.80	Gadag Betegeri	99.00	Kanakapura	101.00	Shahapur	33.00
VII	**Solid Waste Management Indicator Report for the State**								
21.	MSW Collection Efficiency		83.75	Naregal	70.59	Tekkalakote	150.00	Afzalpur	4.55
22.	% households under door to door collection		44.74	Heggadadevanakote	26.86	Karkala	128.57	Bhatkal	0.17
23.	Efficiency in redressal of customer complaints		95.16	Koppa	100.00	Koppal	160.54	Devadurga	26.67
VIII	**Water Supply Indicator Report for the State**								
24.	No. of Days of water supply per week		4.16	Rayabagh	3.00	Afzalpur	7.00	Bailahongal	1.00
25.	No. of Hours of Water Supply in a Day		1.78	Belur	1.00	Udupi	18.00	Arakalgud	0.45

(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
26.	Extent of working metered of water connection		86.62	Belthangadi	84.00	Gulbarga	100.00	Mysore	35.00
IX	**Waste Water Management Indicator Report for the State**								
27.	% of HH with Sewerage connection		27.86	Chitradurga	20.78	Belur	109.82	Hospet	0.04
28.	Collection efficiency of waste water.		56.27			Ron	182.00	Kalagatgi	1.92
29.	% of Waste Water Treated		55.04	Hassan	18.74	Annigeri	125.00	Mangalore	7.38
30.	Extent of reuse and recycle of treated waste water		87.88	Ranebennur	85.00	Annigeri	100.00	Channarayapatna	68.33
31.	Extent of cost recovery in waste water management		19.24	Ramanagaram	1.53	Bhatkal	156.25	Mangalore	0.77
32.	Efficiency in redressal of customer complain		96.55	Maddur	100.00	Bailahongal	100.00	Mandya	71.43
X	**Municipal Finance Annual Report for the State**								
33.	No. of Properties	25,12,992.00	13,657.57	Kudligi	6,176.00	Hubli Dharwad	2,09,625.00	Hosanagara	909.00
34.	Current Demand in ₹ Lakh	46,713.10	252.50	Malavalli	4.40	Raichur	31,200.00	K.R.Pet	3.20
35.	Current Collection in ₹ Lakh	12,683.43	68.19	Malavalli	3.20	Mangalore	1,727.10	Teradal	0.16
36.	Arrears Demand in ₹ Lakh	10,555.39	58.00	Shiggaon	6.14	Hubli Dharwad	1,633.60	Saragur	0.26
37.	Arrears Collection in ₹ Lakh	6,379.70	36.04	Ron	5.23	Mangalore	966.93	Savanur	0.07
38.	Tax Receipts in ₹ Lakh	30,905.26	193.16	Malavalli	12.58	Afzalpur	14,261.00	Siddapur	0.02
39.	Own Receipts in ₹ Lakh	15,279.40	97.94	Kudligi	12.05	Hubli Dharwad	1,703.00	Sadalaga	0.42
40.	ULB Expenditure in ₹ Lakh	65,946.66	374.70	Kudligi	28.12	Mangalore	15,822.00	Madhugiri	3.50

(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
41.	No. of Permanent Employees	17,015.00	91.97	Periyapatna	30.00	Hubli Dharwad	1,961.00	Saligrama	7.00
42.	Salary in ₹ Lakh	23,144.97	124.44	Periyapatna	37.18	Hubli Dharwad	4,710.80	Chikkaballapur	1.14
43.	Establishments Cost in ₹ Lakh	9,077.47	50.15	Moodabidri	3.00	Belgaum	3,981.85	Chincholi	0.35
XI	**Development of Parks & Gardens Annual Report for the State**								
44.	Area under parks & gardens with in ULB(Sq. Mtr)	1,64,08,360.34	85,017.41	Shiggaon	88.05	Mysore	38,48,000.00	Kudachi	0.00
XII	**Roads, Streetlights & Drain System Annual Report for the State**								
45.	Total Road Length in Kms	24,136.92	113.32	Mahalingapur	45.00	Mysore	1,773.00	Kudligi	4.34
46.	Weather Road Length in Kms	15,246.08	73.65	Kudligi	15.00	Mysore	1,523.34	Shiggaon	0.50
47.	Length of Roadside Drains in Kms	21,970.11	104.62	Mahalingapur	38.00	Mysore	2,170.00	Guledgudda	1.00
48.	O&M of Roads in ₹ Lakh	12,655.93	70.31	Aland	2.60	Mangalore	1,075.00	Hanur	0.24
49.	No. of Streetlights	7,29,479.00	3,524.05	Mundargi	1,448.00	Mangalore	61,523.00	Devanahalli	210.00
50.	O&M of Streetlights in ₹ Lakh	9,288.34	44.66	Kundagol	10.00	Mysore	1,015.63	Jog Kargal	0.42
51.	No. of Water logging cases	934.00	7.02	Surpur	4.00	Bellary	105.00	Anekal	1.00
52.	No. of Water logging points	1,266.00	8.61	Surpur	4.00	Bellary	105.00	Anekal	1.00
53.	No. of Complaints Received on Roads,Drains & Streetlights	2,28,743.00	1,089.25	Madhugiri	176.00	Hubli Dharwad	33,862.00	Shahapur	3.00

(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
54.	Complaints Redressed on Roads,Drains & Streetlights	2,22,931.00	1,061.58	Madhugiri	164.00	Hubli Dharwad	33,813.00	Shahapur	1.00
XIII	**Municipal Solid Waste (MSW) Management Report for the State**								
55.	MSW Generated in TPD	6,176.18	29.00	Mudalagi	8.00	Madhugiri	1,116.00	Wadi	1.60
56.	MSW Collected in TPD	5,218.62	24.50	Muddebihal	8.50	Madhugiri	900.00	Afzalpur	0.25
57.	MSW Transported in TPD	5,090.56	24.13	Muddebihal	8.50	Madhugiri	900.00	Saligrama	0.45
58.	Length of Road Cleaned in Kms	13,652.03	64.70	Konnur	16.00	Malur	3,600.00	Ron	0.25
59.	No. HHs Door Step Collection	9,48,427.00	7,239.90	Mandya	2,150.00	Mysore	1,93,761.00	Bhatkal	11.00
60.	Organic Waste Seperated	11,004.11	305.67	Talikote	4.00	Bhatkal	6,707.00	Doddaballapur	0.10
61.	scientifically treated in TPD	695.12	26.74	Lakshmishwara	4.00	Mysore	250.00	Doddaballapur	0.10
62.	scientifically disposed in TPD	815.97	22.67	Malur	10.00	Mysore	250.00	Afzalpur	1.00
63.	complaints received under SWM	23,073.00	124.72	Kushtagi	30.00	Hubli Dharwad	3,317.00	Hoovinahadagali	1.00
64.	complaints redressed under SWM	22,790.00	123.19	Kushtagi	22.00	Hubli Dharwad	3,317.00	Hoovinahadagali	1.00
XIV	**Municipal Solid Waste Management Annual Report for the State**								
65.	Total capacity of the vehicles in Tonnes	45,856.31	221.53	Moodabidri	4.50	Ullal	16,240.00	Gudibande	1.00
66.	Salary of the employees under SWM in ₹ Lakh	27,43,954.99	14,595.51	Shahabad(CMC)	8.75	Teradal	16,84,428.00	Ullal	0.52
67.	Amount spent on Contracts in ₹ Lakh	11,26,424.66	6,868.44	Rabkavi Banhatti	6.00	Teradal	10,83,888.00	Wadi	0.35
68.	Total expenditure by ULB on SWM in ₹ Lakh	3,447.94	19.16	Arakalgud	1.51	Belgaum	270.00	Koratagere	0.02

(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
69.	Total O&M cost under SWM in ₹ Lakh	38,73,827.62	19,369.14	Mudigere	23.61	Teradal	27,68,317.20	Savanur	1.00
70.	Total Revenue generated under SWM in ₹ Lakh	13,398.40	478.51	Indi	0.50	Teradal	10,000.00	Naregal	0.02
XV	**Waste Water Management Annual Report for the State**								
71.	Waste Water Collected in MLD	321.12	10.04	Karwar	0.15	Mysore	144.00	Kalagatgi	0.02
72.	Waste Water Treated in MLD	270.56	11.27	Ron	1.14	Mysore	144.00	Karwar	0.12
73.	Waste Water Reused in MLD	47.25	5.91	Maddur	2.50	Bellary	30.00	Hunsur	1.50
74.	Electric Bill in ₹ Lakh	366.47	20.36	Shrirangapatna	0.60	Mysore	120.00	Shidlaghatta	0.35
75.	Salary in ₹ Lakh	245.40	10.67	Tumkur	1.53	Mysore	60.00	Guledgudda	0.22
76.	Contract Cost in ₹ Lakh	498.69	22.67	Tumkur	1.57	Mysore	120.60	Holenarsipura	0.48
77.	Maintenance Cost in ₹ Lakh	1,353.46	58.85	Channarayapatna	1.89	Mysore	860.00	Guledgudda	0.22
78.	Total Expenditure in ₹ Lakh	2,464.01	70.40	Shrirangapatna	4.35	Mysore	1,160.60	Guledgudda	0.44
79.	UGD Revenue in ₹ Lakh	657.60	31.31	Bailahongal	0.75	Mysore	544.66	Vijayapura	0.01
XVI	**Waste Water Management Report for the State**								
80.	No. of house holds with UGD connections	4,87,316.00	11,332.93	Srinivasapur	275.00	Mysore	1,39,200.00	Hospet	15.00
81.	No. of complaints received under UGD	19,553.00	444.39	Holenarsipura	62.00	Mysore	5,488.00	Belur	2.00
82.	No. of complaints redressed under UGD	19,018.00	442.28	Holenarsipura	58.00	Mysore	5,488.00	Belur	2.00

XVII	Water Supply Management Annual Report for the State								
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
83.	Surface Water in MLD (Drawn)	1,615.76	9.08	Mundargi	2.20	Mysore	220.00	Ankola	0.00
84.	Surface Water in MLD (Treated)	1,575.28	9.27	Mundargi	2.20	Mysore	220.00	Chikkanayakanahalli	0.10
85.	Surface Water in MLD (Supplied)	1,489.98	8.47	Mundargi	2.20	Mysore	195.00	Ankola	0.00
86.	Ground Water in MLD (Drawn)	775.02	4.08	Maddur	0.20	Bidar	450.00	Ankola	0.00
87.	Ground Water in MLD (Treated)	68.94	1.50	Shiraguppa	0.79	Bidar	20.50	Ankola	0.01
88.	Ground Water in MLD (Supplied)	260.77	1.57	Sullya	0.66	Bankapura	34.00	Ankola	0.01
89.	Purchased Water in KLD	2,637.47	87.92	Virajpet	20.00	Mangalore	480.00	Kanakapura	1.20
90.	Electric Bill in ₹ lakh	19,570.11	97.36	Mudalagi	16.70	Mysore	2,040.00	Kunigal	0.39
91.	Total O&M in ₹ Lakh	55,700.00	266.51	Moodabidri	70.27	Tumkur	15,918.60	Shahabad(CMC)	3.20
92.	Current Demand in ₹ Lakh	14,496.30	69.36	Kumta	13.93	Hubli Dharwad	2,425.32	Saligrama	1.63
93.	Current Collection in ₹ Lakh	18,130.41	87.59	Malavalli	3.53	Raichur	9,039.00	Tekkalakote	0.10
94.	Arrears Demand in ₹ lakh	19,584.95	96.00	Kushalanagara	3.17	Mysore	4,969.65	Mudalagi	0.05
95.	Arrears Collection in ₹ Lakh	3,669.74	18.35	Robertsonpet	3.80	Hubli Dharwad	718.64	Mudalagi	0.01
96.	Connection Chareges in ₹ Lakhs	1,527.14	7.87	Malavalli	0.20	Indi	500.00	Arakalgud	0.01

Source : Municipal Reforms Cell, KMRP.

Annexure 4.e

Status of Reforms in Karnataka under JnNURM

Reforms	Number	Implemented	Under Implementation
Mandatory- State	7	5	2
Mandatory- City *Bengaluru* *Mysore**	6 *6* *6*	3 *3* *5*	3 *3* *1*
Optional *State* *Bengaluru* *Mysore*	10 *5* *5* *5*	7 *3* *5* *4*	3 *2* - *1*
Urban Transport- State	6	6	-
Urban Transport- City *Bengaluru* *Mysore*	6 *6* *6*	3 *4* *3*	3 *2* *3*
TOTAL	35	24	11

* In Mysore Reform on User Charges has been implemented.

Source : Status of Reforms in Karnataka under JnNURM (March, 2011), KUIDFC

1.1 Service Contract - Santiago, Chile

The public utility in Santiago, Chile, namely, EMOS is owned by government agencies. EMOS has a corporate status, and has relied on service contracts to a large extent for improving services. Employees have also been encouraged to leave and set up sub-contractor firms, which compete for undertaking service contracts. The activities, which are sub-contracted, include long term planning, feasibility studies, construction contracts, quality control systems, water supply services and other commercial activities. The holding company continues to provide subsidies for the poorer section of users. This model has resulted in high productivity (two employees for every thousand connections) and improved service quality. Near commercial return on equity is reported to have been achieved in the process. EMOS shares are now being sold and full divestiture is being contemplated.

1.1. Management Contract - Gaza, Israel

A high level of UFW, poor water quality and low daily per capita consumption influenced Gaza to choose the management contract route. It took Gaza nearly eight months to put in place the contract, which was awarded to a private party after an international competitive bidding (ICB) process. The results indicate that UFW has been brought down, together with increased water consumption and higher revenue collections.

1.2. Lease Contract - Conakry, Guinea

On account of high UFW and tariffs, Guinea faced problems in allocating responsibilities and risks. It also faced problems in coordinating investment and operations. Due to these reasons, Guinea decided to lease out the water supply systems in Conakry and 16 other towns in the year 1989. This has resulted in substantial increase in access to potable water with increased number of connections and there is a progression towards full cost recovery.

1.3. Concession Contract -Manila, Philippines

Poor management of the sector, under-investment, poor coverage, significant debt service liability and high staffing forced Manila city to relook at its options for providing water supply and sewerage services. Manila awarded two twenty-five year concessions for water supply and sewerage services based on output driven service targets. The Concessionaire was made responsible for augmentation of the water supply system and meeting the existing debt service obligations. The concessions were awarded following an ICB procedure. A regulator was responsible for tariff review with limited government guarantees. The bid was awarded based on the lowest quoted tariff. The conditions of employment of the existing staff were also protected.

The outcome of the above effort has been that privatization is acting as a catalyst, in improving the services. The local Government Units and Water Districts are seriously looking at private sector participation in some form. This has also resulted in interest being generated in other sectors such as power, roads, ports, railways and hospitals.

1.4. Concession Contract - Buenos Aires, Argentina

The services levels of water supply and sewerage in Buenos Aires (population 8.6 million in 1993) were abysmally low with no orientation between the service provider and the consumer. The atmosphere was characterized by political interference, fiscal constraints, and environmental/ health problems.

Given this background, Buenos Aires decided to award water supply /sanitation services provision for the Buenos Aires metropolis under a 30-year concession. This was awarded to the lowest bidder Lyonnaise des Eaux (The bid quoted a tariff level 27.4% lower than the existing tariff). The Concession contract includes mandatory service expansion and improvements. The Concession is being regulated by a tripartite agency (ETOSS) of national, provincial and municipal governments. Though results have been encouraging, there have been ongoing disputes with the regulator and the Government on tariffs and water consumption.

1.5. Divestiture of Assets - England and Wales, UK

The UK Government felt that there was a good opportunity in leveraging the water assets for private funding. The geographical area of operations was divided into ten parts in the year 1973, which was subsequently handed over for management to private companies in the year 1989. The Government regulated the performance of these companies by setting out standards for percentage coverage and quality parameters1. It achieved the desired results in making it profitable and 100% households were covered over a period of time. Supply now exceeds demand with the water table rising.

The key issues that surfaced in this experiment were evolution of company structures and the debate on regulation vis-à-vis free competition.

1.6. Co-operative Arrangement - Santa Cruz, Bolivia

Santa Cruz, Bolivia has the distinction of having adopted a cooperative arrangement. Under this arrangement, the water company which was owned by the Municipality was converted into a co-operative in the year 1979, whereby each household being served by the water utility owned a share in the Company known as the Co-operative Saguapac.

One of the reasons of success of this model is the limited number of households covered by the co-operative. This arrangement is also being attempted in Argentina.

1.7. Management, Affirmage and Concession Contracts - France

France adopted multiple models - management contracts, affirmage contracts, and concession contracts. The water industry was organized on municipal basis. Six municipal and three main private groups are operating in the country. The assets are owned by local government and by private/public hybrids at local level. Regulation was made applicable at both national and regional level. There were no national set charges but tax was imposed on water supply at municipal level. Regulation addressed issues such as general arrangements regarding water quality and environment and specific arrangements relating to organization and conduct of private participation in the industry.

1.8. Observations and Conclusions

Almost all the countries seem to have a similar beginning of sub optimal service levels. The overriding motive in most low-income countries for restructuring is the need for finance to expand and meet growing demand. However, no single cause for restructuring could be pinpointed, as these range from internal factors and external factors such as conditions stipulated by international donors/lending agencies.

a. It is worth noting that private sector initiatives in urban water supply sector are fairly recent. The rationale of privatizing water utilities accelerated during the early 1990s. U.K. Surprisingly the U.K. model of privatization has not been replicated elsewhere in the world has used different models of privatization in several countries initiated by the first full-scale privatization.
b. The French model of concessions is widely accepted, more so in Latin American countries.
c. Significant gains have been achieved in Southern African countries without private sector participation. However, they have used private sector performance as a benchmark to measure the effect of the improvements in their systems.
d. In the matter of regulatory framework, structures of some countries are still embryonic, while others lack transparency and in some others the organizational structure is excessively complex.
e. South Asia has not attempted any major restructuring of the urban water supply systems.
f. The governmental issues, which are common with regard to private participation in urban water supply systems, include capacity to manage the macro-economic environment and capacity to regulate private sector participation and investment decision-making.
g. No single model has gained universal acceptance and regarded as an optimal solution.
h. The key to the success of private sector participation would be in the proper implementation of the selected structure and with the adoption of an appropriate regulatory framework. The next important approach consideration is to strengthen the urban utilities to enable them to be self-sustaining and strong financial entities that could attract the best of the private sector capabilities for improved service delivery and cost effective measures to the benefit of the consumer.

Abbreviations:

ADB	Asian Development Bank
AEE	Assistant Executive Engineer
AIBP	Accelerated Irrigation Benefit Programme
ATI	Administrative Training Institute
BBMP	Bruhat Bengaluru Mahanagara Palike
BCM	Billion Cubic Metres
BDA	Bangalore Development Authority
BMRCL	Bangalore Metro Rail Corporation Limited
BSUP	Basic Services for Urban Poor
BWSSB	Bangalore Water Supply and Sewerage Board
C & AG	Comptroller and Auditor General
CADA	Command Area Development Authority
CBA	Cost Benefit Analysis
CCA	Culturable Command Area
CDP	City Development Plan
CDS	Community Development Societies
CE	Chief Engineer
CFT	Cluster Facilitation Team
CGG	Centre for Good Governance
CITB	City Improvement Trust Board
CMC	City Municipal Council
CMO	Central Mechanical Organization
CMSMTDP	Chief Ministers Small and Medium Towns Development Program
CNNL	Cauvery Neeravari Nigam Limited
CPO	Chief Project Officer
CRF	Central Road Fund
DC	Deputy Commissioner

DEA	Department of Economic Affairs
DI	Deprivation Index
DMA	Directorate of Municipal Administration
DPR	Detailed Project Report
DPU	District Project Unit
DTP	Department of Town Planning
EAP	Externally Aided Project
EE	Executive Engineer
EI	Economic Importance
EIA	Environment Impact Assessment
EIRR	Economic Internal Rate of Return
ERC	Expenditure Reforms Commission
FC	Finance Commission
FD	Finance Department
FPI	Fiscal Policy Institute
GBWASP	Greater Bangalore Water Supply & Sanitation Project
GIS	Geographical Information System
GoI	Government of India
GoK	Government of Karnataka
GP	Gram Panchayat
Ha	Hectare
HKDB	Hyderabad Karnataka Development Board
HPC	High Power Committee
HPEC	High Power Expert Committee
HQ	Headquarters
HR	Human Resources
HUDCO	Housing and Urban Development Corporation
IBRD	International Bank for Reconstruction and Development

iDeCK	Infrastructure Development Corporation (Karnataka) Limited
IDS	Institution Development Studies
IDSMT	Integrated Development of Small and Medium Towns
IEBR	Internal and Extra Budgetary Resource
IHSDP	Integrated Housing and Slum Development Programme
IR	Inspection Report
IRC	Indian Roads Congress
IRR	Internal Rate of Return
ISEC	Institute for Social and Economic Change
IT	Information Technology
ITDP	Integrated Tank Development Project
IWRM	Integrated Water Resource Management
JICA	Japan International Co-operation Agency
JnNURM	Jawaharlal Nehru National Urban Renewal Mission
JSYS	Jala Samvardhane Yojana Sangha
KBJNL	Krishna Bhagya Jala Nigam Limited
KCBTMP	Karnataka Community Based Tank Management Project
KERS	Karnataka Engineering Research Station
KFRA	Karnataka Fiscal Responsibility Act
KIADB	Karnataka Industrial Areas Development Board
KIPA	Karnataka Institute of Public Auditors
KLFAFRA	Karnataka Local Fund Authorities Fiscal Responsibility Act
KMRP	Karnataka Municipal Reforms Project
KNNL	Karnataka Neeravari Nigam Limited
KPWD	Karnataka Public Works Department
KRDCL	Karnataka Road Development Corporation Limited
KSCB	Karnataka Slum Clearance Board
KSF & ES	Karnataka State Fire & Emergency Services

KSHA	Karnataka State Highways Act
KSHIP	Karnataka State Highways Improvement Project
KSHTTA	Karnataka State Highways , Traffic and Transport Authority
KTPP Act	Karnataka Transparency in Public Procurements Act, 1999
KUDA Act	Karnataka Urban Development Authorities ACT
KUIDFC	Karnataka Urban Infrastructure Development and Finance Corporation
KUWASIP	Karnataka Urban Water Sector Improvement Project
KUWS&DB	Karnataka Urban Water Supply & Drainage Board
KWDT	Krishna Water Disputes Tribunal
LIS	Lift Irrigation Schemes
LPCD	Liters Per Capita Per Day
MC	Management Committee
MD	Managing Director
MDR	Major District Roads
MI	Minor Irrigation
MIS	Management Information Systems
MLD	Million Litres Per Day
MNY	Mukhyamantri Nagarothana Yojane
MoEF	Ministry of Environment and Forests
MOU	Memorandum of Understanding
MPIC	Monthly Programme Implementation Calendar
MSW	Municipal Solid Waste
MTFP	Medium Term Fiscal Plan
MUDA	Mysore Urban Development Authority
NABARD	National Bank for Agriculture and Rural Development
NBC	National Building Code
NGO	Non Governmental Organization
NHAI	National Highway Authority of India

NHG	Neighbourhood Committees
NKUSIP	North Karnataka Urban Sector Investment Programme
O&M	Operations and Maintenance
PAC	Public Affairs Centre
PIM	Participatory Irrigation Management
PIU	Project Implementation Unit
PMC	Project Management Consultant
PMI	Project Management Institute
PMU	Project Management Unit
PPIAF	Public Private Infrastructure Advisory Facility
PPP	Public Private Partnership
PSU	Public Sector Undertaking
PWD	Public Works Department
PWPIWTD	Public Works, Ports and Inland Water Transport Department
PWSS	Piped Water Supply Scheme
R&R	Resettlement and Rehabilitation
RIDF	Rural Infrastructure Development Fund
RoW	Right of Way
RTI	Right To Information
SC & ST	Schedule Caste & Schedule Tribe
SCP	Special Component Plan
SCRC	Socio Cultural Research and Study Centre
SDP	Special Development Programme
SE	Superintending Engineer
SJSRY	Swarna Jayanthi Shahari Rozgar Yojana
SLEC	State Level Empowered Committee
SLNA	State Level Nodal Agency
SLSC	State Level Steering Committee

SOS	Strategic Option Study
SOU	State Project Unit
SPV	Special Purpose Vehicle
SR	Schedule of Rates
STEP-UP	Skill Training For Employment Promotion amongst Urban Poor
SWD	Solid Waste Disposal
TA	Transaction Advisor
TECSOK	Technical Consultancy Services Organization of Karnataka.
TFC	Thirteenth Finance Commission
TMC	Thousand Million Cubic
TMI	Tank Management Institutions
TP	Taluk Panchayat
TSP	Tribal Special Plan
TUG	Tank User Group
UAS	University of Agricultural Sciences
UCDN	Urban Community Development Network
UDD	Urban Development Department
UFW	Unaccounted For Water
UGD	Under Ground Drainage
UIDSSMT	Urban Infrastructure Development Schemes for Small and Medium Towns.
ULB	Urban Local Body(ies)
USA	United States of America
USEP	Urban Self Employment Programme
UWEP	Urban Wage Employment Programme
UWSP	Urban Women Self Help Programme
UWSS	Urban Water Supply Schemes
WALMI	Water and Land Management Institute
WRA	Water Regulatory Authority

WRD	Water Resource Department
WRDO	Water Resources Department Organization
WUA	Water Users Association