



Global Academy of Technology
Research and Consultancy Centre
Department of Civil Engineering

5th August 2009

To

Dear Sir,

Thank you very much for the kind support and overwhelming encouragement in respect of conducting one-day, "ACTION PLAN WORKSHOP FOR REJUVENATION AND SUSTENANCE OF ARKAVATHI RIVER BASIN" on Saturday, 25th July 2009. The event witnessed good participation from government, non government organizations and academic institutions. The participation of key stake holders in the panel discussion held in the morning and afternoon with DR. K V Raju (Economic advisor to Chief Minister, GOK) and Dr.Yellappa Reddy (Renowned Environmentalist) leading the way has resulted in very valuable recommendations in respect of rejuvenating all our water bodies in Arkavathi Basin. In this connection the role of students, academic institutions and citizens were felt to be very vital for long term sustenance.

Please find herewith enclosed all details of the seminar i.e., proceedings, view points, recommended action plans, list of technical papers etc.

We wish to carry this forward through useful studies in all micro watersheds of ARKAVATHI Basin and finally wish to place it before government through elected representatives for implementation.

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PROCEEDINGS OF THE ACTION PLAN WORKSHOP FOR
REJUVENATION AND SUSTENANCE OF ARKAVATHI RIVER BASIN HELD
ON 25TH JULY 2009

Jointly organized by

Department of Civil Engineering, Global Academy of Technology
And
Geological Society of India

A total of 126 participants from 36 organizations/experts, participated in the work shop.

During the workshop, summary of 16 papers contributed by different experts were presented and issues raised by the experts were placed for the panel discussion, moderated by Dr. K.V.Raju (Economic advisor to Chief Minister, GOK).

Panelists:

1. Dr. K.V.Raju, **Moderator**, Economic Advisor to Chief Minister, GOK.

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2. Dr. A.N.Yellappa Reddy, Former Secretary to Government Forest Ecology and Environment
3. Capt Raja Rao, Former Secretary to Government , Minor Irrigation
4. C.V.Patil, Chief Engineer , W R D O
5. Roop Kumar, Chief Engineer B W S S B
6. Suresh, Superintending Engineer Minor Irrigation

Issues Raised:

1. How to stop degradation of nature?
2. How to plan at micro watershed level, keeping in view of conservation and sustenance of the river system?
3. How to adopt Best Management Practices with local specific issues to avoid ill effects of urbanization?
4. Implementation of existing laws to protect the environment.
5. Institutional and financial arrangement required for speedy action plan generation and implementation.

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6. Awareness among all stake holders.

Recommendations:

1. To establish Arkavathi Basin Rejuvenation Authority with local people participation, consisting of Technical advisory panel with financial and administrative powers for quality implementation including enforcement of legal aspects.
2. Preparation of the action plans at the micro watershed level giving importance to harvesting rain water, rejuvenation and conservation of the existing water bodies, and addressing the needs of the people of the area ensuring their involvement.
3. Involving the Technical Educational Institutions for planning, monitoring and implementation. Adherence to well designed terrain/basin specific Best Management Practices (BMP) to avoid ill effects of urbanization.
4. Bringing awareness among all stake holders about scarcity of natural resources for proper conservation, by actively involving NGO's and Educational Institutions.
5. To establish repository of water resources data by using the technologies like remote sensing and geographic information system which can provide very valuable dynamic data for the policy makers and elected representatives to objectively resolve all issues related to water.
6. To preempt all possibilities of future problem with very effective and efficient planning and not to look for solutions after bad implementation/execution - **prevention is better than cure**.
7. Civil Engineering Department of Global Academy of Technology is committed to generate in the next three months , typical action plans for two micro water sheds each representing urban and rural areas , with the active participation of NGO's and local bodies

REPORT

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Department of Civil Engineering of Global Academy of Technology and Geological Society of India jointly organized one day “*Action plan workshop For Rejuvenation And Sustenance of ARKAVATHI River Basin*” on Saturday, 25th July 2009 at Seminar Hall, Jnana Jyothi Auditorium, Palace Road, Bangalore, intended to arrive at concurrent implementable action plans through deliberations in respect of,

1. Status of naturally endowed water resources revealed by maps and satellite images
2. Impact of urbanization on the natural system
3. Changing scenario of the hydrology
4. Issues related to water pollution
5. Status of rainfall and scope for water harvesting
6. Legal frame work for follow-up action
7. Integrated use of water resources
8. Administrative boundaries and role of elected representatives

Participants of the workshop included elected representatives of ARKAVATHI Basin, Bureaucrats, Non government organizations, heads of academic institutions, government officers, students etc. Bangalore Development Authority, Arghyam foundation, KSPCB, KSIIDC, KPCL, Science & Technology Academy, and BWSSB have sponsored this event.

Following technical papers were presented by various authors to set stage for focused deliberations during the seminar to aid preparation of action plan for subsequent implementation.

1. Arkavathi Darshana - Dr.Y Lingaraju
2. Urban Hydrology – Emerging Perspective - Dr. C V Srinivasa
3. Scarcity of water - Will Bangalore face its natural death? - Capt. S. Raja Rao
4. How to Save the Lakes of Bangalore? - An Action Plan - V. Balasubramanian
5. Merging Ecological and Legal Aspects in Conservation of Arkavathy Basin - Dr. N. Nandini, Dr. A.N. Yellappa Reddy and Aboud S. Jumbe
6. Ground water resources in Arkavathi Basin - Dr. T. N. Venugopal and C. S. Ramasesha
7. Arkavathi Sutti Banda Patrakarthana Anisike - Mr.Manjunath
8. Arkavathy Information Repository -a means towards managing water resources - Dr. V.R.Hegde

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9. Integrated Approach and Speedy Laws are needed to Rejuvenate Arkavathy - Dr. K. Shivashankar
10. Water Quality Studies in Arkavathi Basin - Shashirekha
11. Institutional and Legal Framework for planning and managing river basins - S.Vishwanath
12. Requiem for our rivers - S.Vishwanath
13. The Role of Computers in the Development of Doddamuduwadi Micro Water Shed, Kanakapura Taluk, Ramanagara District - Dr. V.N.Vasudev, Nagaraj, Bangarshetty and N. Prabhakara
14. Restoration of lakes in Bruhuth Bangalore Mahanagar Palike – Satish
15. Characterization study on reservoir water bodies fed by polluted river and its effect on soil & vegetation (case study of Byramangala tank fed by vrishabhavathi river in Arkavathi catchment) K.V.Lokesh ,G.Ranganna H.Chandrashekar
16. Delineation of artificial recharge zones of Arkavathi river basin using Remote sensing and GIS –Techniques- T.J . Renuka Prasad

Background:

Water availability (quantity and quality) is a very critical issue which will decide existence of our cities in future, because

1. In urban areas water is used as a means of transport - runoff with all collected pollutants and transport of wastes.
2. Any substance used in society will be present in waste water. Water can be treated to any degree of purity at an ever increasing cost. No matter how well treated there is always a detectable residue.
3. Some substances are suitable for removal at treatment plants (e.g., organic matter, nutrient, bacteria) others are not suitable and should be removed at the source.
4. Waste water treatment transfers pollution from one medium to another, i.e., solids and air.
5. Environmental problems are treated in isolation - they have to be looked at in total.

Arkavathi River flowing through the urban space of Bangalore is subjected to pollution and other maladies along with all the water bodies connected to it. An integrated scientific study of this Arkavathi river basin on RS-GIS platform (with the help of various themes like water bodies ,drainage network, soil, land use, hydro-geomorphology etc.) will enable auditing and accounting of water usage. By the consideration of various micro watersheds in the region it is possible to address all

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the issues of urban and peri urban centers at a local level to make the entire basin (Macro level) sustainable. Vulnerability of shallow and deep aquifer, intensive urban activities, Potable water supply etc. needs to be evaluated for implications with emphasis on costs and benefits of alternative actions and also to derive best decision pathway under uncertainty through optimal utilization.

The preparation of action plan for urban centers, with the consent of citizens, farmers, elected representatives, nongovernmental organizations etc. through a single point of contact (SPOC) Governing Body has the potential to arrive at acceptable legislation for total compliance by all user groups in respect of waste disposal and management of all water sources and control of anthropogenic activities through Best Management Practices (BMP). This paves way for arriving at policy decisions and implementation solutions for

1. Protection and Maintenance of safety and health of communities (removal of flood water and human waste).
2. Protection of the natural environment (pollution control of streams and atmosphere).
3. Sustainability of the system (long term and wide spread consequences).

List of views, expressed by participants:

1. We have shown utter disregard for lakes, dumping garbage into lakes, polluting lakes and ground water, no legal action is being taken to halt these activities; we need to draw the attention of the government.
2. BWSSB is the biggest polluter of our fresh water streams; they need to have proper treatment facilities well distributed in the whole urban area to avoid pollution of ARKAVATHI basin. BWSSB can have two divisions one for water supply and other for waste water besides a separate unit for solid waste management. There are no proper guidelines for handling hazardous waste.
3. It is just not ARKAVATHI basin, the whole of Karnataka (2 lakh Sq.Km) needs proper attention. This can happen only through sound planning and not by

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creating specific institutions or authorities. Coordination, its enforcement, strict implementation is necessary.

4. In light of Cauvery water dispute tribunal (CWDT) Karnataka will get meager share of surface water and hence it becomes necessary for us to increase ground water potential in the state through good water harvesting techniques.
5. Non technical measures like fencing the boundaries of lakes can protect lakes from encroachment, pollution etc.
6. One institution cannot handle the big issue of protecting a river basin; an authority modeled along the lines of "Sydney Catchment Authority" will be very useful. BMRDA has not used the very useful study report submitted by ISRO.
7. Engineering colleges (students & Faculty), and common people can play a major role in protecting our water sources.
8. Institution-people (top-down), people-institution (bottom-up) approach on the lines of Maharashtra model will help rejuvenating lakes through a central regulatory authority.
9. Participation of private sector in social activities is very limited and their participation is very important as in west.
10. People should also be proactive in respect of water conservation activities; everything cannot be expected from the side of government.
11. Is there any example of people leaving their property voluntarily for the cause of society project? If this surrender of property is related to obtaining an alternate property elsewhere or compensation, magnitude of compensation has been worked out? Perhaps for any government compensation of certain kind is beyond the ability. Who should provide compensation and how much?
12. Participatory management may be successful at a local level but, this may not be so at a regional level.
13. While solving state problems do not mix national disputes, improving surface water availability and quality will benefit state in ground water resource.

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14. Comprehensive resource planning is necessary, rain water harvesting is important, we can leverage on IT for creating awareness in rural areas
15. How to define awareness? When do we say people are aware, does it consider implementation success?
16. The whole hydrological cycle has been impaired due to encroachment, loss of greenery etc., rejuvenation is necessary for good rainfall
17. Chemical fertilizers for agriculture are also contributing to pollution in a great way, ex. Nitrates. A and B horizons of soil is eroded, lakes are highly eutrophic, along with nitrates even sulphate concentration is very high in water. We have to catch water wherever it falls and other good rain water harvesting methods will be useful.
18. Less number of institution, it is that much better to address all issues related to water, good planning is the key for success in a better way than having one more institution to solve the problem.
19. Our states ordinance on Cauvery has been turned down by Supreme Court whereas the favorable orders of president in respect of Krishna water is not considered by the state, instead KJBNL is adapted with less or no impact. We need to work towards increasing our ground water potential which is not covered under any legal constraint.
20. Bangalore has grown from an area of 175 Sq.Km to massive 750Sq.Km making all efforts untenable, pollution control rejects many project/industry proposals whereas the state government approves them.
21. It is not a bad idea to have dual pipe line system where treated (tertiary) water can also be supplied separately.
22. Various schemes involving steep gradient, massive pumping requirement are cost prohibitive.
23. Minor irrigation department is addressing rejuvenation of tanks with priority through fencing. Awareness among societies and public needs to be

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enhanced and as a model one tank, first tank of Arkavathi needs to be rejuvenated and rest in the chain one after another.

24. BWSSB is implementing water cleaning project in three valleys, in Katriguppe, all individual houses are connected to storm water
25. Rejuvenation of Suvarnamukhi will help crop production.
26. A good citizen awareness drive is necessary
27. What is the quantum of encroachment, A.T. Ramaswamy's report can throw some light on this.
28. All programs should happen at ward level, no officer is responsible, METRO rail project is happening in the most independent way, due to tunneling, ground water source is depleting.
29. A comprehensive ground water study is necessary for the presence of Dyke like METRO structures to assess the damage to bore wells.
30. Dr.Muddushekar of Indian institute of science and National Institute of Rock Mechanics have done an extensive study of ground water implications and rock stability because of METRO project and recommendations and suggestions of these are very useful for METRO project.
31. Desilting of tanks needs to be done on a priority basis, success for rejuvenation of tanks lies in desilting.
32. It is always difficult to bring elected representatives for any activity related to rejuvenation of water bodies; with their help awareness programs can be successful.
33. Detergent factories are also contributing in a major way for water pollution. Steps are necessary to use non phosphorous soaps/detergents.

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34. Our command area development law is not as stringent as in Europe to control/monitor the growth of industries.
35. Majority of public have lost faith in all initiatives of government, we need to involve people with progressive thoughts and actions, in order to stop unmindful exploitation of nature.
36. Japanese method of water treatment is good and we need to adapt this method
37. We have to involve, MLA's, MP's, ZP, TP, Municipality and all representatives, the number is around 9000 for ARKAVATHI basin to bring change in maintaining our water bodies as a role model for rest of the country.
38. In spite of spending over 2000 Crore, CLEAN GANGA project has not met with any success; unless rural component is an integral part of development no scheme will be successful.
39. In America government does not enjoy much standing in respect of development works, all being done with private partnership; we need to mature much more as a democracy.
40. More intense afforestation programs are necessary every year.
41. Underground tunnels to connect rivers as in Maharashtra state may also be replicated in state wherever it is possible.
42. Movies like "Inconvenient Truth" by Al Gore will be very useful catalyst in efforts to save and sustain our resources.
43. We have to look for alternate sources for water including using treated water.
44. We need to celebrate Arkavathi Habba" every year as a part of the effort to rejuvenate Arkavathi.

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45. Impression of Arkavathi consisting of big canals with huge quantity of water will be completely shattered immediately next to its birth in Nandi Hills. Even the first tank in the chain is not fed by water nowadays.
46. All efforts of this kind of workshop should be compiled and sent to media for publicity and overall contribution towards rejuvenating water bodies.
47. The action group should meet at least once in two months ,review the progress, and chalk out action plan for the future, to continuously sustain efforts for the complete success of the set objectives.
48. How to measure performance of authorities, activities, government departments, citizens awareness, how to go about coordinating our efforts for a common cause?
49. In many places in ARKAVATHI basin even coconut water contains fluoride, distillery units are the worst offenders in ground water contamination.
50. Industries which have started earlier now being in the midst of dense urbanization continue the same practices and polluting everything, now law is preventing them for proper treatment of effluents.
51. Even people who consume these contaminated water (many times very clear in look) are not aware of the serious consequences of consuming heavy metals in significant quantities.
52. Our history has many useful references in respect of trees being useful for most of the ailments including water purification.
53. All contribution in respect of society work should be related to employment to make things workable.
54. One of the NGO has taken up the work of working on 700 micro watersheds in an integrated way.

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55. Waste water should not be allowed to mix with sewage, well distributed micro treatment plants are very useful.
56. We have to discourage planting of eucalyptus for commercial reasons as it is environmentally harmful.
57. We have to encourage farmers through compensation for not using chemical fertilizers which contaminate water heavily with nitrates (example of Munich).
58. Several good examples like the work done by Rajendra Singh in Rajasthan, 25000ha protected land near Madanapalli, Bangalore university water harvesting project, RV college of engineering project in Vrushavabathi valley, Agasthya Foundation in Kuppam, have to be followed for improvement in rainfall, ground water quality and sustenance in water resources using abundantly available central funds
59. Sand lease entrusted to village authorizes earlier was not a successful venture.
60. Rainfall in Bangalore is sufficient to meet its entire demand, we need to implement an appropriate water harvesting scheme for this.
61. Nowadays we have to divert our attention for the problem of siltation in all major and minor dams of state which has effectively reduced the live storage of dams.

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