Global Water Partnership

WATER FOR LIFE
2005–2015

National Workshop on
Area Water Partnerships
23-24 Dec. 2005, Nashik, India

Organized By
Purna Area Water Partnership, Akola, M.S.

Sponsored By
India Water Partnership, New Delhi.

Guidelines for Area Water Partnership for Implementation of IWRM at the ground level

Background of GWP.

The international community has long considered how to address the water crises, and during the past decade it has reached consensus on fundamental principles for water resources management as enshrined in chapter 18 of Agenda 1 adopted at Rio in 1992. It has been recognized at :

- Fresh water is a finite and vulnerable resource, essential to sustain life, development and environment.
- Water development and management should be based on a participatory approach, involving users, planners and policy makers at all levels.
- Women play a central part in provision, management and safeguarding of water.
- Water has an economic value in all its competing uses and should be recognized as an economic good as well as a social good.

To help translate these principles into practice, the Global Water Partnership (GWP) was formally established in August 1996. GWP asserts that to manage water sustainably for continued human development, the competing uses for water must be reconciled. This can occur only if the parties competing for fresh water share the mutual goal of appropriately adjusting their demands and engage in dialogue on how to do so. Integrated Water Resources Management (IWRM) is the means to reach this goal, and it aims to ensure the coordinated development and management of water, land and related resources by maximizing economic and social welfare without compromising the sustainability of

the vital environmental system.

GWP promotes IWRM by creating fora at global, regional and local levels. These fora are used for debate on the Dublin Rio principles, dissemination of knowledge on how these principles can be operationally applied in practice, exchange of experiences and mobilization of the fiscal and human resources necessary to achieve IWRM.

Promotion of AWPs.

To help translate Integrated Water Resources Management (IWRM) into practice South Asia Technical Advisory Committee of GWP has promoted establishment of Area Water Partnerships (AWPs) for the water stressed area of South Asia. Water stress may be on account of shortage of water or on account of poor quality of water. AWP is a multidisciplinary action group of local stakeholders.

AWP provides a platform for water related institutions and stakeholders for interaction to achieve IWRM at the local level.

In the Area Water Partnerships, the main task is to identify inner dependency of various water related institutions and stakeholders in water and to suggest necessary reforms for mobilizing their work on an integrated basis.

Working of the Area Water Partnerships has been discussed in details in the South Asia Technical Advisory Committee meetings. Area Water Partnership has been unanimously acknowledged as the effective means of taking the IWRM to the grass root level.

Identification of water stressed areas for promotion of AWPs has been initiated since 2000 in South Asia. Vision Documents of eight AWPs were presented in the first South Asia Water Forum (SAWAF) held in February 2002 at Kathmandu, Nepal. It evoked lot of interest amongst the participants because of its excellent potential to test the implementation of IWRM principles at the field level.

Criteria of establishing an AWP

By now 30 Area Water Partnerships are in the different phases of evolution and work. Basically 4 phases of evolutionary process have been kept in view.

i) Conceptual Phase

ii) Exploratory Phase

iii) Establishment Phase

iv) Network Management Phase

- Country Water Partnerships (CWPs) are encouraged to identify the critical water stressed areas and promote the AWPs for such areas.
- While identifying critical water stressed areas to promote Area Water Partnerships, the size of the area for the water partnership should neither be too large to manage the integrated planning and operation, nor to be too small to be ineffective for the integrative process. It has been decided by SASTAC that the size for AWP in South Asia should range between 1,000 to 20,000 Sq. km.
- Area Water Partnership is promoted for a river basin or for a sub-basin or for a well-defined group of sub-basins. Sources of water supply for them as well as the effluents from such habitations consequently encompass more than one sub-basin. For such critical areas the relevant "hydraulic area" comprising of the concerned sub-basin is to be properly defined for the purpose of integration of water related aspects.
- Membership of an Area Water Partnership is open to all water related institutes / organizations and groups of stakeholders from the target area.

- To pursue the concept of Area Water Partnership there should be at least 25 institutions / organizations interested to work together for the potential beneficiary area.
- Operationally effective stakeholders in the identified partnership area should not be less than eight.
- Organizations / institutions involved in Area Water Partnership could be members of Global Water Partnership, Country Water Partnerships or of the Regional Thermatic Networks of GWP South Asia depending upon their interest and reach.

Criteria for membership

Criteria for admission and retention of organizations / agencies as partners in the Area Water Partnerships are :

Length of existence ..... at least one year of the institutions / agency :

year of standing

Financial capacity and availability ..... at least for audited accounts the past one year.

Membership strength of the ..... minimum ten institution / agency

Expertise / experience in water ..... Involvement in related activities in terms of outputs at least One (publications / reports could be a water related measurable criteria)

activity in the past.

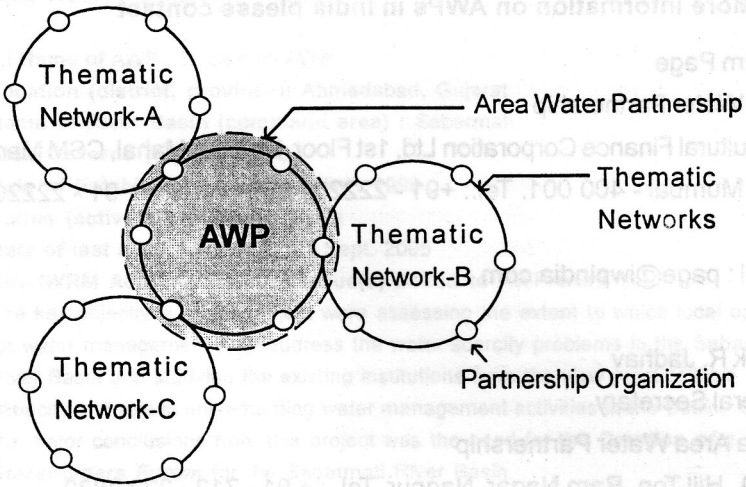
Disciplines represented in AWP

Generally following disciplines are expected to be reflected in the AWP for enabling a comprehensive approach to the management of water.

1. Irrigation
2. Water supply and sanitation
3. Industries
4. Grass root level community Organizations
5. Economists
6. Media
7. Women
8. Politicians / administrators
9. Environmentalists
10. Sociologists
11. Educationists
12. Youth groups
13. Social workers
14. Pollution Control Boards / Authorities
15. Geo-hydrologists
16. Hydropower Development Authorities
17. Legal experts
18. Scientists

Functioning of AWP

- The style of functioning of Area Water Partnership will be as a non governmental, non political network even though Government agencies are partners in the local work.
- One of the partner organizations has to work as a host institution for providing the secretarial support to the work of Area Water Partnership voluntarily on a continuous basis on a partnership mode.
- A small steering committee (4 to 8 partner representatives) is to be formed to guide the day to day work of the Area Water Partnership.



Output

On establishment of an Area Water Partnership, its first task is to develop Vision 2025 and a Framework For Action (FFA) to achieve the vision.

Its Vision and FFA documents are to be approved and adopted in the annual general body meeting of the Area Water Partnership.

Such approved vision document can be presented in the South Asia Water Forum (SAWAF) proposed to be organized every year in the South Asia or at the annual gathering of the AWPs in South Asia.

A separate network of AWPs under the South Asia Regional Water Partnership (RWP) for exchanging information and experiences in the implementation of IWRM in South Asia is in offing for providing the coordinating facilities to the network.

For More Information on AWPs in India please contact

Vikram Page
India Water Partnership
Agricultural Finance Corporation Ltd, 1st Floor, Dhanraj Mahal, CSM Marg, Fort, Mumbai - 400 001. Tel.: +91 - 222202 8924 Fax : + 91 - 222202 8926
Email : page@iwpindia.com

Ashok R. Jadhav
General Secretary
Purna Area Water Partnership
43 - A, Hill Top, Ram Nagar, Nagpur. Tel. : + 91 - 712 - 222 3830
Mob. : 09823010567

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Area Water Partnership Profile

1 : Name of AWP : Sabarmati AWP
Location (district, province): Ahmedabad, Gujarat
Name of River Basin (command area) : Sabarmati
Area Covered (sq.km) : 300
Date of Establishment / Inception : 1999
Status (active/not active) : Active
Date of last AWP meeting : 17th Sept. 2005
Key IWRM Activity(s) and/or Issue(s) linked to AWP work :
The key objectives of the project were assessing the extent to which local options for water management help address the water scarcity problems in the Sabarmati River Basin and studying the existing institutions from the view point of their capacity and role in implementing water management activities in the Basin. One of the major conclusions from this project was the need for the ***Creation of a Stakeholders Forum*** for the Sabarmati River Basin.
No. of Partners/ Stakeholders : Core Groups of SSF (1) Agriculture Core Group 23
(2) Industrial Core Group: 33
(3) Urban Core group: 35
Names of Partners/ Stakeholders : A. Agriculture core group:

1. Director of Research, Sardar Krishi Nagar, Dantiwada Agriculture University, District Banaskantha, Gujarat, 385 506;
2. Director, Department of Agriculture, Krishi Bhavan, Sector 10-A, Gandhinagar – 382 043Director, Department of Horticulture, Krishi Bhavan, Sector 10-A, Gandhinagar – 382 043
3. Dr. S. R. Chaudhry, Managing Director, Gujarat State Seed Corporation, Beej Bhavan, Sector 10-A, Gandhinagar – 382043;
4. Director of Animal Husbandry, Government of Gujarat, Gandhinagar;
5. Director of Agricultural extension, Sardar Krishi Nagar, Dantiwada Agriculture University, District Banaskantha, Gujarat, 385 506;
6. Director, National Research Centre for Groundnut, Junagadh – ICAR, Post Box No. 5, Junagadh – 362 001;
7. Mr. M. G. Mehta Vice Principal, CORDET- Kalol, c/o IFFCO Kalol Unit, Dist. Gandhinagar, 382 423;
8. Research Scientist, Micro-nutrient Project (ICAR), Anand Agricultural University, B. A. College of Agriculture, Anand campus, Anand – 388 110;
9. Research Scientist, Biofertilizers department, Anand Agricultural University, B. A. College of Agriculture, Anand – 388 110;

10. Research Scientist, Castor and Mustard Research Station, Sardar Krishi Nagar, Dantiwada Agriculture University, District Banaskantha, Gujarat, 385 506;
11. Research Scientist, Wheat Research Station, SK Nagar Agriculture University, Vijapur, Mahesana – 382870;
12. Gujarat State
13. Research Scientist, Maize Research Station, SK Nagar Agriculture University, Godhra, Panchmahals;
14. Research Scientist, Cotton Research Station, Surat;
15. Research Scientist, Dry farming Technology Department, Sardar Krishi Nagar, Dantiwada Agriculture University, District Banaskantha, Gujarat, 385 506;
16. Head, Central Soil & Water Conservation and Training Institute, Vasad, Anand 388 306;
17. Ahmedabad.

B. Industrial Core group:

The Managing Director

1. Gujarat Water Resources Development Corporation Ltd., Gandhinagar
2. Shri G H Trivedi, Environment Engineer, Gujarat Pollution Control Board, Gandhinagar.
3. The Municipal Commissioner, Ahmedabad Municipal Corporation, Ahmedabad
4. The Director (Environment), Ministry of Environment & Forests, Govt of Gujarat
5. Shri Robert David, Managing Trustee, Sahyog Charitable Trust, Ahmedabad
6. The Chief Engineer, Gujarat Industrial Development Corporation, Gandhinagar
7. The Collector, Ahmedabad District, Ahmedabad
8. Shri. Shalin Shah, Naroda Enviro Projects Ltd, Ahmedabad

18. Dr R Gopi Chandran, Center for Environment Education,

9. Ahmedabad
10. The Chairman, Ahmedabad Urban Development Authority, Ahmedabad
11. Shri Sunil Parekh, Ahmedabad
12. Dr. S. Raman, VIKSAT, Ahmedabad
13. Shri Kiritbhai Patel, President, Vatva Industries Association, Ahmedabad
14. Shri Sureshbhai Shah, Chairman, Odhav Enviro Projects Ltd, Ahmedabad
15. Shri Panubhai Chhotabhai Patel, President, Kharicut Canal Khedut Mandal, Ahmedabad
16. Shri Anand Shah, Convener, INDICORPS, Ahmedabad
17. Shri Jayeshbhai Chawda Manav Sadhna, Ahmedabad
18. Shree Ajitbhai Ravjibahi Patel, Vice President, Kharicut Canal Khedot Mandal, Ahmedabad

19. Shri Bipinbhai Patel, Chairman, Green Environment Services Co-op. Society Ltd, Ahmedabad
20. Shri Shaileshbhai Patwari, Chairman, Naroda Enviro Projects Limited, Ahmedabad
21. Shri Bhalchandrabhai B. Modi, Director (Advocacy), Consumer Education Research Centre, Ahmedabad
22. Shri B.R.Shah, Advocate (High Court), Ahmedabad
23. Shri Mahesh Pandya, Samajik Nyaya Kendra (Jan Vikas), Ahmedabad
24. Shri Santosh Yellore, Director (Laboratory), Consumer Education Research, Ahmedabad
25. The Managing Director, Gujarat Water Resources Development Corporation Ltd, Gandhinagar
26. The Regional Officer, Gujarat Pollution Control Board (GPCB), Ahmedabad
27. Shri H. N. Thakkar, Dy. Town Planner (Environment Cell), Ahmedabad Urban Development Authority, Ahmedabad
28. The Member Secretary, Gujarat Pollution Control Board, Gandhinagar
29. The Secretary, Dept ofWater Resources Govt of Gujarat, Gandhinagar
30. Shri B R Sheth, City Engineer, Ahmedabad Municipal Corporation
31. Shri Janak Patel, Ahmedabad
32. Shri Ushir C. Shah, Vista Corporation, Ahmedabad
    Prof. Shivanand Swami, Centre for Environment Planning Technology (CEPT), Ahmedabad

Source of Funding (CWP, other outside donor – if so name of donor : Self funded

Address: VIKSAT
Nehru Foundation for Development
Thaltej Tekra
Ahmedabad-380054, Gujarat, India

Area Water Partnership Profile

2 : Name of AWP : Upper Bhima AWP
Location (district, province): Pune Dist, Maharshtra
Name of River Basin (command area : Upper Bhima (Krishna Valley)
Area Covered (sq.km) : 14700
Date of Establishment / Inception : 1st August 2001
Status (active/not active : Active
Date of last AWP meeting : 15th December 2004

1. **Key IWRM Activity(s) and/or Issue(s) linked to AWP work :** Written and presented a document viz. ' Vision for the development of Upper Bhima Basin by 2025 ' in the first South Asia Water Forum held at Kathmandu, Nepal in February 2002. It was stated to be the first document of its kind owned and accepted by any AWP in the South Asia/ the World.
2. Creating awareness amongst urban and rural stakeholders to avoid wastage/ misuse of water, improved quality of water in rural area by ' SODIS ' (solar disinfection).
3. Written (by V.M.Ranade) and published (by Maharashtra Vikas Kendra, NGO associated with UBWP) and sold about 7000 copies on No profit-No loss basis, it being a vital issue for rural upliftment.
4. Initiated 'Best managed Watershed Development Village' competition to induce involvement of stakeholders in this important activity. Kept prizes of Rs 25000 for the first three best villages.
5. Water-related issues in the UBWP, a water scarce river basin, were taken up at the international level by actively participating in the following International Symposia
6. World Water Symposium, Stockholm, Sweden in Aug 2003 - Poster on modern water management in Upper Bhima Basin.
7. WWS,Stockholm,Sweden in Aug 2004 - Poster on Watershed Development.
8. International River Symposium, Brisbane,Australia in Sept 2005 - Poster on Urban Rural conflict due to river pollution by Urban and Industrial use in Pune city.
9. Through High-school students, taken up campaign, to achieve economy in the use of domestic water by outreaching about 1200 families from Pune city. Similar survey was carried out in rural area through students.

Written articles in local newspapers about water related issues in Upper Bhima Basin for increasing awareness amongst stakeholders.

No. of Partners/ Stakeholders : 24

National Workshop on Area Water Partnerships

23 - 24, December 2005

Nashik - M.S. India

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Organized by

Purna Area Water Partnership, Akola, M.S., India

★★

Sponsored by

India Water Partnership, New Delhi, India

★★★

In association with

Upper Godavari Area Water Partnership, Nashik

Maharashtra Engineering Research Institute (MERI)

Hydrology Project, Water Resources Department,

Govt. of Maharashtra, Nashik.

GWP - SAS

Nanda Abheywickrama

Chairperson

Global Water Partnership - South Asia

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Colombo, Sri Lanka

Tel : +94 - 11 - 2787404 Fax : +94 - 11 - 2786854

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Area Water Partnership's in India

Many watersheds have already been categorized as dark watersheds as far as groundwater development is concerned. Many more are likely get into that category soon. Many sub basins are also getting into the category of 'closed sub basins' with hardly any untagged free water left for further maneuverability. The future of such watersheds and sub basins will very much depend on the water saving measures that will have to be introduced in the different uses currently prevalent there. There are also increasing instances where the stream channels are excessively polluted and need a serious effort for the clean up activities.

The future of all these watersheds, sub basins and river lengths will depend on the homogeneous collective approach that can be adopted by the stakeholders together. The relative costs and benefits of making any adjustments in terms of quantity and quality will have to be properly evaluated to decide upon a joint strategy. Integrated management will have to be the basis of further pattern of water related activities there.

Water partnerships of the stakeholders linked together by the common water resource will be necessary to analyze the problematic situation and to decide upon the appropriate further actions on the basis of a common understanding for the improved status of the watershed or the sub basin.

2005-2015 has been declared by the United Nations as the decade for action in water. The effort in India will have to be to identify the watersheds and sub basins that already have problems or that are likely to have difficulties in the near future in terms of quantity or quality of the water. All the stakeholders from such areas will have to be brought together on a common platform to initiate a collective dialogue on the difficult situation being faced by them and to evolve a shared strategy for a better future.

It is hoped that the experience gained by the Area Water Partnerships that are already active in India will provide the necessary direction and confidence for moving further in the right direction. The national workshop at Nashik should be a milestone in that context.

MADHAV ATMARAM CHITALE
Hon. Sr. Advisor GWP-South Asia

MESSAGE

The development in irrigation and socio- economic sector, increasing and conflicting demands has created awareness among the people about water, it's conservation and optimum utilization. Participatory Irrigation Management (PIM) is an opportunity for the beneficiaries to bring into reality their ideas about maintenance and use of irrigation system. Government of Maharashtra has adopted formation of Water Users Association as a tool for implementation of PIM. Recently Waghad canal system has been handed over to the Water User's Association. This is a memorable achievement.

Government of Maharashtra has made farmer's participation mandatory in Irrigation Management and Act for the same has been enacted. Sharing views of water expertize through a dialogue by way of workshop is necessary for promoting PIM concept.

With this view, I am very pleased that Purna Area Water Partnership, a renowned NGO in water Sector has arranged National Workshop on Area Water Partnership at Nashik during 23-24 Dec.2005.

I hope that this workshop will end up with horizon of new ideas in PIM and boost the process of people participation to the great extend.

I wish a grand success to this social awareness task and proceedings of insueing workshop.

(S.V.Sodal)
Secretary (CADA)
Water Resources Department
Government of Maharashtra
Mantralaya, Mumbai- 400032

Forward

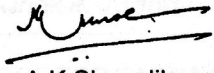
It gives us a great pleasure to organize National Workshop on Area Water Partnerships on the 23rd & 24th December 2005 as a sequel to organizing the first South Asia Workshop on AWPs in India in Sept.2002. This workshop is also first of its kind at National level. The workshop is basically aimed at promoting discussions on establishment of Area Water Partnerships in India, and particularly the IWRM principles, role of women organizations in AWP, Water Governance with reference to AWPs and present status of exiting AWPs and their problems.

AWP being the multistakeholders platform with multidisciplinary approach can prove useful facilitator to bring all major key stakeholders on one common platform to implement IWRM principles at ground level.

This year being the first year of International water decade (2005-2015) for action as decided by the UN. This workshop is an appropriate attempt to stimulate action on ground for strengthening the existing AWPs and establishing new AWPs in water stress areas.

Purna Area Water Partnership is trying to resolve issues related to water crisis through participatory approach and we are happy to note that most of the partner institutions are responding to our call for their active participation

I take this opportunity to gratefully acknowledge the cooperation and whole hearted support of India Water Partnership and others institutions who are actively associated with this workshop and hope that fruitful deliberation of this workshop will help us progress better to our objectives.



A.K.Shenolikar
Chairman
Purna Area Water Partnership,Akola, India

- The steering committee has to meet at least once in a month to promote the objectives of Area Water Partnership and to pursue the planned activities.
- Area Water Partnership may adopt a "Patron" if they so desire who will work in his individual capacity to promote the cause of IWRM in the target area.
- AWP may also nominate 3 expert advisors to AWP- two from the local area, and one on behalf of the CWP to guide the progress towards IWRM.

Financial Support

Financial support for organizing one preparatory workshop, follow up workshop for the partnership developing the vision is generally provided by GWP - South Asia subject to availability of funds.

For carrying out the further programmes of AWP on continuous basis the organizations / institutions should stand by their own as far as financial requirements are concerned.

For the core existence of AWP a small membership fee may be levied and for specific water related programmes, money may be raised thro' participatory contribution, donations and grants.

Link with thematic networks

Strong links will be established between the Area Water Partnership and Thematic Networks / Associate Programmes in and around the area.

The Area Water Partnership may include partner organizations form the thematic networks. Their relation can be somewhat as shown below :

Names of Partners/ Stakeholders : A. Agriculture core group:

1. Action For Agricultural Renewal in Maharashtra (AFARM - an NGO), Pune
2. Gram Vardhini (NGO), Pune
3. Vanrai (NGO), Pune
4. Gomukh Trust, Pune
5. Jeevan Sanstha (NGO), Pune
6. Sakal (Newspaper), Pune
7. Srishthi Eco-Research Institute, Pune
8. Ground Water Consultech Foundation, Pune
9. DD Associates, Pune
10. Development through Resource Organisation and Planning (DROP – an NGO), Pune
11. Ecological Society, Pune
12. Gangotri Trust, Pune
13. Jnana Prabhodini (NGO), Pune
14. Maharashtra Krishna Valley development Corporation, Govt of Maharashtra
15. Society for Peoples Participation in Ecosystems Management (SOPPECOM – an NGO), Pune
16. Central Water and Power Research Station, Govt of India
17. Ground Water Indtitute, Pune
18. Indian Water Works Association (IWWA – an NGO), Pune
19. Indian Council for Dams and Development, Pune
20. Nisarga Sevak (NGO), Pune
21. Suvarna Jyothi (NGO), Pune
22. Pune Womens Network, Pune
23. Indian Water Resources Society, Pune

Source of Funding (CWP, other outside donor – if so name of donor): Self funded

Address : AFARM , 2/23 Raisoni Park, Pune 411037, Maharashtra, India

Area Water Partnership Profile

3 : Name of AWP : Patalganga AWP
Location (district, province): Raigad Dist, Maharashtra
Name of River Basin (command area : Patalganga
Area Covered (sq.km) : 940
Date of Establishment / Inception : August 2001
Status (active/not active : Active
Date of last AWP meeting : 21st October 2005
Key IWRM Activity(s) and/or Issue(s) linked to AWP work : Ten identified vision elements have been linked up to pollution aspects, stakeholders participation and capacity building at village level
No. of Partners/ Stakeholders : 22

1. **Names of Partners/ Stakeholders :**
2. Tata Power
3. Maharashtra Industrial Development Corporation
4. Khopoli Municipal Council
5. Raigad Zilla Parishad
6. Khopoli Industires Association
7. Ground Water Authority, Maharashtra
8. Revenue Department, Government of Maharashtra
9. Forest Department, Government of Maharashtra
10. Maharashtra Jeevan Pradhikaran
11. City and Industrial Development Corporation of Maharashtra
12. Navi Mumbai Municipal Corporation
13. Maharashtra Pollution Control Board
14. Priya CETP Cooperative Society
15. Hindustan Organic Chemicals
16. Local bodies such office of Tahsildar, Municipal Councils, Gram Panchayat
17. Yusuf Meheralli Centre
18. Rural Community Research Centre, Khalapur
19. Mumbai Metropolitan Region Development Authority
20. Konkan Development Corporation
21. Indian Water Works Association and
22. Gram Panchayat of rural levels
23. Reliance Industries

Source of Funding (CWP, other outside donor – if so name of donor) : At present IWP. In future stakeholders will have to arrange funds of their own
Address : "Dwarka" Pushpadhanwa Co. op. Hsg. Society
Pt. MM Malviya Road, Mulund (West), Mumbai – 400 080, Maharashtra, India.

Area Water Partnership Profile

4 : Name of AWP : Upper Godavari AWP
Location (district, province): Nashik, Ahmednagar, Aurangabad Dist, Maharashtra
Name of River Basin (command area : Godavari
Area Covered (sq.km) : 41478
Date of Establishment / Inception : 30th June 2002
Status (active/not active : Active
Date of last AWP meeting : 25th February 2005

1. **Key IWRM Activity(s) and/or Issue(s) linked to AWP work :** Awareness programmes
2. Involving Students - from Schools and Colleges in AP works.
3. Involving Women through Women Water Networks in AWP work.
4. Study of River Godavari, identifying problems of the area developing solutions for the same and involving stake holders for implementing solutions.
5. Preparing Vision Document for Upper Godavari

No. of Partners/ Stakeholders : 38

1. Names of Partners/ Stakeholders :

1. Gokhale Education Society, Nashik
2. JDC Bytco Institute of Management Studies & Research, Nashik
3. VC Shahane, Convener, Nashik
4. Daily Gavkari, Nashik
5. Swadhyay Pariwar, Nashik
6. Nashik Municipal Corporation
7. Nashik Education Society
8. Institute of Engineers, Nashik
9. Maharashtra Pani Parishad, Ahmednagar
10. Maharashtra Jeevan Pradhikaran, Nashik
11. Jal Vidya Bhavan, Nashik
12. K.K.Wagh Education Trust, Nashik
13. K.K.Wagh Engg.College, Nashik
14. Western Maharashtra Sinchan Bhavan, Nashik
15. Farmers Federation, Nashik
16. Rotary Club, Nashik
17. Madhyvarti Sankalpachitra Sangathana, Nashik
18. Sinchan Bhavan, Nashik

19. GSDA, Nashik
20. Samaj Parivartan Kendra, Nashik
21. Mr Mohan Kulkarni, Nashik
22. Dr R S Warkhede, Nashik
23. Mr Ashok Sonawane, Nashik
24. Western Mahrashtra Irrigation Dept
25. Mr Vivek Kulkarni, Nashik
26. Samarth Water Users Cooperative Society, Nashik
27. Dhyaneswar Cooperative Sugar Factory, Ahmednagar
28. Mula Cooperative Sugar Factory, Ahmednagar
29. Sanjivini Cooperative Sugar Factory, Ahmednagar
30. Wruddheshwar Cooperative Sugar Factory, Ahmednagar
31. Rahuri Agricultural University, Ahmednagar
32. Irrigation Department, Govt of Maharashtra
33. Centre for Social & Rural Development, Ahmednagar
34. Amrutvahini College of Engineering, Ahmednagar
35. Rahuri Cooperative Sugar Factory, Ahmednagar
36. Agasti Cooperative Sugar Factory, Akola
37. Indo German Watershed Programme, Ahmednagar
38. Mr Shankarrao Kolhe, Ahmednagar

Source of Funding (CWP, other outside donor – if so name of donor) :
Gokhale Education Society

Address : JDC Bytco I MSR, Prin. T.A.Kulkarni Vidya Nagar,
College Road, Nashik 422 005, Maharashtra, India

Area Water Partnership Profile

5 : Name of AWP : Purna AWP
Location (district, province): Akola, Amaravati, Bhuldhna Dist, Maharashtra
Name of River Basin (command area : Purna River In Tapi Basin
Area Covered (sq.km) : 17650
Date of Establishment / Inception : 1994
Status (active/not active : Active
Date of last AWP meeting : 15th May 2005

1. **Key IWRM Activity(s) and/or Issue(s) linked to AWP work :** To resolve the problem of falling water levels caused by Saline Ground Water in Saline belt of Purna River Basin

No. of Partners/ Stakeholders : 53

1. Names of Partners/ Stakeholders :

1. Agriculture Produce Marketing Committee, Akot, Dist. Akola
2. Akot Ginning and Pressing Co-op. Factory (Ltd.), Akot, Dist. Akola
3. Amravati University, Amravati
4. Anuradha Engineering College, Chikhli, Dist. Buldhana
5. Association of Consulting Civil Engineers, Nagpur
6. Central Ground Water Board, Nagpur
7. Central Water Commission, Nagpur
8. Chandrabhaga Nadi Khore Vikas Mitra Mandal, Chandur (Rly.), Dist. Amravati
9. Chief Engineer, Irrigation Dept., Nagpur
10. Chief Engineer, Maharashtra Jeen Pradhikaran, Amravati
11. Chief Engineer, VIDC, Amravati
12. College of Engineering of Technology, Babhulgaon, Akola
13. District Suprintending Agriculture Officer, Akola
14. District Suprintending Agriculture Officer, Buldhana
15. Dr Punjabrao Deshmukh Agriculture University, Akola
16. Friends Forum for Purna River Basin Development, Nagpur
17. Government Engineering College, Amravati
18. Ground Water Survey and Development Agency, Amravati
19. Indian Water Resources Society, Nagpur
20. Indian Water Works Association, Nagpur
21. Institution of Engineers (India), Nagpur
22. Jain Irrigation Systems, Jalgaon

23. Joint Director, Agriculture Dept., Amravati
24. Khare Panipatta Vikas Sangharsha Kruti Samiti, Akot, Dist. Akola
25. Maharashtra Remote Sensing Application Center, Nagpur
26. Minor Irrigation (Zilla Parishad), Buldhana
27. Minor Irrigation Dept. Zilla Parishad, Akola
28. Minor Irrigation Dept. Zilla Parishad, Amravati
29. National Academy of Agriculture Enterpreneurship and Marketing, Nagpur
30. President, Zilla Parishad, Akola
31. President, Zilla Parishad, Amravati
32. Project Director, District Rural Development Agency, Akola
33. Project Director, District Rural Development Agency, Amravati
34. Project Director, District Rural Development Agency, Buldhana
35. Sant Gajanan Maharaj College of Engineering, Shegaon, Dist. Buldhana
36. Shri Shivaji Agriculture College, Amravati
37. Shri Shivaji Education College, Amravati
38. Sinchan Sahayog, Akola
39. Sinchan Sahayog, Amravati
40. Sinchan Sahayog, Buldhana
41. Superintending Engineer, Akola Irrigation Circle, Akola
42. Superintending Engineer, Buldhana Irrigation Project Circle, Buldhana
43. Superintending Engineer, Minor Irrigation Dept., Amravati
44. Swarajya Gramin Vikas Yuwak Shikshan Sanstha, Amravati
45. The Akot Urban Co-operative Ltd., Akot, Dist. Akola
46 Vanrai Friends Circle, Amravati
47. Vasant Urban Credit and Co-operative Society, Akot, Dist. Akola
48. Vidharbha Irrigation Development Corporation, Nagpur
49. Vidharbha Statutory Development Board, Nagpur
50. Vishveshvarayya national Institute of Technology, Nagpur
51. Womens Water Forum, Nagpur
52. Youth Water Forum, Nagpur
53. Zilla Parishad, Buldhana

Source of Funding (CWP, other outside donor – if so name of donor): IWP and other Partner institutions such as Akot Urban Co-op.Bank Ltd, Akot

Address Purna Area Water Partnership
43-A, HillTop, Ramnagar
Nagpur-440033, Maharashtra, India

Area Water Partnership Profile

6 : Name of AWP : Aurangabad AWP
Location (district, province): Aurangabad Dist, Maharashtra
Name of River Basin (command area : Godavari Valley
Area Covered (sq.km) : 1640
Date of Establishment / Inception : January 2000
Status (active/not active : Active
Date of last AWP meeting : 29th September 2005
Key IWRM Activity(s) and/or Issue(s) linked to AWP work :

1. To identify the sub-basin based problems related with water resources and management.
2. To help to resolve these identified problems through a co-ordination committee comprising of Government, semi Government, private sector agencies, Academic institutions N.G.O etc.
3. To create workable projects for the development and proper management of water resources of the sub-basin.
4. To promote the demand of equitable distribution of water resources through public awareness programs.
5. To use working solutions to the recurring and concurrent problems through public dialogue and scientific inputs.
6. To high light aspects of the cost of water and water price to be paid by the water users through exhibition, drama, skits and poster presentation in the education institutions.
7. Gender sensitization in the judicious and equitable distribution and utilization of water.
8. Water quality monitoring for safe and potable drinking water to avoid water borne epidemics in the region.

No. of Partners/ Stakeholders : 12
Names of Partners/ Stakeholders :

1. Aurangabad Municipal Corporation ,Aurangabad
2. Maharashtra Industrial Development Corporation, Aurangabad Division.(MIDC)
3. Maharashtra Jeevan Pradhikaran, Water Supply & Drainage Aurangabad Divn.
4. Maharashtra Pollution Control Board,Regional Office Aurangabad.
5. Aurangabad Zilla Parishad.(District Councils)
6. Minor Irrigation Aurangabad Division.
7. Agriculture Department , Aurangabad Division.
8. Aurangabad District Health Services.
9. Dr. Babasaheb Ambedkar Marathwada, University- N.S.S. unit, Aurangabad.
10. Rotary Club-Metro Aurangabad.
11. Lions Club Chikhaltana, Aurangabad.
12. Marathwada Institute of Technology, Aurangabad.

Source of Funding (CWP, other outside donor – if so name of donor): IWP
Address: Chairman, Aurangabad Area Water Partnership
Principal, MIT, Satara Village Road, PB No: 327, Aurangabad - 431005

Area Water Partnership Profile

7 : Name of AWP : Kshipra AWP
Location (district, province): Indore & Malwa District, Madhya Pradesh
Name of River Basin (command area : Kshipra
Area Covered (sq.km) : 4751
Date of Establishment / Inception : 27th September 2000
Status (active/not active : Active
Date of last AWP meeting : 18th July 2005
Key IWRM Activity(s) and/or Issue(s) linked to AWP work :

1. To make Kshipra river pollution free
2. To conserve water in the watershed of Kshipra river basin
3. To promote activities for roof top rainwater harvesting in towns of Kshipra river basin and villages
4. To empower women basically in villages to enhance their livelihood through watershed management activities
5. To promote horticulture and livestock development activities involving proper water management
6. To hold seminars and workshops for bringing awareness on various aspects of IWRM among different sectors of society

Developing water-media network for AWP and CWP

No. of Partners/ Stakeholders : 24

Names of Partners/ Stakeholders :

1. Water Resource Department, (M.P.)
2. Public Health Engineering Dept (M.P.)
3. Pollution Control Board, Indore
4. Rural Engineering Services, Indore / Ujjain
5. Ground Water Survey Dept, Ujjain
6. Agriculture Department
7. Department of Horticulture, Indore
8. Industries Department
9. Geo-hydrologists Forum, Indore
10. Municipal Corporations, Indore and Ujjain
11. School of Continuing Education, Vikram University, Ujjain
12. Indore School of Social Work
13. SGS Inst of Technology and Science Indore

14. Govt. Engineering College, Ujjain
15. Vaishnav Polytechnic, Indore
16. ICMS, Indore
17. Water Users Associations, Indore and Ujjain divisions
18. Nagar Panchayats
19. Industries Associations
    Kshipra Improvement Association, Kshipra Dist-Indore
    Ambedkar Inst, Mhow, Indore
20. MP Rajya Mahila Ayog, Bhopal
21. Navadeep Voluntary Organization, Indore
    Ahilyamata Goshala, Indore
22. College of Agriculture, Indore
    Farmers Associations, Indore and Ujjain
23. Aloo-Beej Utpadak Sahkari Sanstha, Indore
24. Kemkar and Kemkar Constructions Company, Indore

Source of Funding (CWP, other outside donor – if so name of donor): IWP, Govt. of MP and different private bodies
(in the form of materials help)

Address: Kshipra Area Water Partnership
Navadeep Voluntary Organization
E- 8/7 , M.O.G. Lines, Indore - 452002

Area Water Partnership Profile

8 : Name of AWP : Betwa Jamini AWP

Location (district, province Tikamgarh Dist, Madhya Pradesh

Name of River Basin (command area : Betwa Jamini

Area Covered (sq.km) : 2293

Date of Establishment / Inception : 8th November 2002

Status (active/not active : Not Active

Date of last AWP meeting : 29th December 2002

Key IWRM Activity(s) and/or Issue(s) linked to AWP work :
Capacity building of stakeholders for the distribution of water

No. of Partners/ Stakeholders : 10

Names of Partners/ Stakeholders :

1. Rajeev Gandhi Watershed Mission
2. Water Resource Department, Government of Madhya Pradesh
3. Public Health Engineering Department, Government of Madhya Pradesh
4. Nehru Yuva Kendra
5. Duda and Jamini Nadi Milli Watershed Projects
6. NGOs- Vikalp, Development Alternatives,MVPSPS, Mahila Chetna Manch, AISECT,Prayas, Jeevan rekha, Manav Viklalang Samiti,Nehru Yuva Kendra
7. 10 Water Users Associations
8. Prithivipur, Jeron, Taricharkala,Niwadi, Orchha Municipal Councils
9. 384 Village Pani Roko Committees
10. Cooperative Fishermen Societies

Source of Funding (CWP, other outside donor – if so name of donor): IWP

Address: Betwa - Jamini River Basin Water Partership
Rajiv Gandhi Watershed Management Mission
District -Tikamgarh, Pin – 472001, Madhya Pradesh, India.

Area Water Partnership Profile

9 : Name of AWP : Datia AWP

Location (district, province : Madhya Pradesh

Name of River Basin (command area : Sindh Riou Basin

Area Covered (sq.km) : 950

Date of Establishment / Inception : March 2003

Status (active/not active : Not Active

Date of last AWP meeting : April 2003

Key IWRM Activity(s) and/or Issue(s) linked to AWP work :
Identification of grey areas and water conservation measures therein

No. of Partners/ Stakeholders : 11

Names of Partners/ Stakeholders :

Committee was constituted under chairmanship of Collector and the following Govt / non-Govt officials.

1. CEO, Zilla panchayat
2. E.E., Public Health Engineering.
3. E.E., Rural Engineering Service.
4. President, Zilla Panchayat.
5. Two Farmer Representatives.
6. Officials from central Ground and Water Conservation Research Institute, Central Grassland Development Institute Jhansi.
7. Members of Water User committee.

Source of Funding (CWP, other outside donor – if so name of donor) : Zilla Panchayat, Datia

Address: Zilla Panchayat, Datia, Madhya Pradesh, India

Area Water Partnership Profile

10 : Name of AWP : Dudhi Tawa AWP

Location (district, province : Hoshangabad Distt., Madhya Pradesh

Name of River Basin (command area : Tawa

Area Covered (sq.km) : 4000

Date of Establishment / Inception : June 9, 2002

Status (active/not active : Not Active

Date of last AWP meeting : June 12, 2005

Key IWRM Activity(s) and/or Issue(s) linked to AWP work :

1. To promote the concept of IWRM among farmers, industries and end users.
2. Create awareness among socially active youth regarding water conservation and other related issues.
3. Ground Water recharging.
4. Views and problems of women facing water scarcity.
5 Workshop and seminars

No. of Partners/ Stakeholders : 9

Names of Partners/ Stakeholders :

1. Navchetna Samiti
2. Aasra Bharati
3. Kishor Bharti
4. Central Water Commission
5. Shanti Gramin Sanstha
6. Kshitij Samaj Seva Sanstha
7. Sahayog Sanstha
8. Satupra Vichar Samiti
9. Gayatri Pariwar

Source of Funding (CWP, other outside donor – if so name of donor):
Navchetna Samiti, Local contritution

Address: Dudhi Tawa Area Water partnership
C/o Archana Krishi Kendra Shobhapur Road, Pipariya 461 775
Distt. Hoshangabad, Madhya Pradesh, India

Area Water Partnership Profile

11 : Name of AWP : Tambraparani AWP

Location (district, province : TirunelveliDistt, Tamil Nadu

Name of River Basin (command area : Tambraparni

Area Covered (sq.km) : 705

Date of Establishment / Inception : 3rd January 2001

Status (active/not active : Active

Date of last AWP meeting : 22nd May 2003 (next Meeting proposed in December 2005)

Key IWRM Activity(s) and/or Issue(s) linked to AWP work :

1. Awareness programmes for water supply, Irrigation, Power, Industries, Fisheries and other water usage

Names of Partners/ Stakeholders

1. Distt Collectors of Tirunelveli & Tutticorin
2. Chief Engineer, Water Resources Organisation, Southern Region, Govt of Tamil Nadu
3. Supdt Engineer, Agricultural Engineering, Govt of Tamil Nadu
4. Supdt Engineer, Tamil Nadu Electricity Board, Tirunelveli
5. Supdt Engineers, Tamil Nadu Water Supply & Sewrage Board
6. Joint Directors, Dept of Agriculture, Govt of Tamil Nadu
7. Joint Director, Dept of Industries, Govt of Tamil Nadu
8. NGO Representatives from Basin
9. Reputed Farmer Organisations
   MLAs and MPs

Source of Funding (CWP, other outside donor – if so name of donor): Donor Organisations

Address: Supdt Engineer, WRO/PWD, Tambaraparani Basin Circle & Chairman Steering Committee, Tambaraparani AWP, Tirunelveli-2, Tamil Nadu, India.

Area Water Partnership Profile

12 : Name of AWP : South Canara AWP

Location (district, province : South Canara Dist, Karnataka

Name of River Basin (command area : Nethravati

Area Covered (sq.km) : 3657

Date of Establishment / Inception : 2003

Status (active/not active : Active

Date of last AWP meeting : June 2005

Key IWRM Activity(s) and/or Issue(s) linked to AWP work :
Water conservation and harvesting measures

No. of Partners/ Stakeholders : 5

Names of Partners/ Stakeholders :

1. Irrigation Department, Government of Karnataka
2. Water Supply Department, Government of Karnataka
3. Agriculture Department, Government of Karnataka
4. Fisheries Department Government of Karnataka
5. All Industries located in the basin
6. In addition to the above a few big /medium and small farmers will also be associated..

Source of Funding (CWP, other outside donor – if so name of donor): IWP

Address: Sahayoga,
#76, 7th Main, 4th Cross, KSRTC Layout
J.P.Nagar Phase II, Bangalore-560078
Karnataka, India

Area Water Partnership Profile

13 : Name of AWP : Gundlakamma AWP

Location (district, province : Andhra Pradesh

Name of River Basin (command area : Gundlakamma

Area Covered (sq.km) : 8195

Date of Establishment / Inception : 23rd November 2002

Status (active/not active : Active

Date of last AWP meeting :

Key IWRM Activity(s) and/or Issue(s) linked to AWP work :
To stop the pollution of water caused by effluent discharge in the Gundlakamma river basin

No. of Partners/ Stakeholders : 4

Names of Partners/ Stakeholders :
Farmers, Industrial users, Local Government Institutions (Gram Panchayats)

Source of Funding (CWP, other outside donor – if so name of donor): IWP

Address: 209, Vijaya Towers, Shanti Nagar, Hyderabad – 500 028,
Andhra Pradesh, India.

Area Water Partnership Profile

14 : Name of AWP : Rayalaseema AWP

Location (district, province : Andhra Pradesh

Name of River Basin (command area : Rayalseem

Area Covered (sq.km) :

Date of Establishment / Inception :

Status (active/not active : Not Active

Date of last AWP meeting :

Key IWRM Activity(s) and/or Issue(s) linked to AWP work :

No. of Partners/ Stakeholders :

Names of Partners/ Stakeholders :

Source of Funding (CWP, other outside donor – if so name of donor):

Address:

Area Water Partnership Profile

15 : Name of AWP : Telengana AWP

Location (district, province : Andhra Pradesh

Name of River Basin (command area : Telengana

Area Covered (sq.km) :

Date of Establishment / Inception :

Status (active/not active : Not Active

Date of last AWP meeting :

Key IWRM Activity(s) and/or Issue(s) linked to AWP work :

No. of Partners/ Stakeholders :

Names of Partners/ Stakeholders :

Source of Funding (CWP, other outside donor – if so name of donor):

Address:

Integrated Water Resource Management (IWRM)

* B. S. Bhavanishankar

Water is critical, but often an overlooked element in sustainable development. In the context of dwindling fresh water resources, due to population explosion, competing demands in different sectors of use and increasing pollution of natural water resources like rivers and lakes, caused by Industrial effluents, sewage disposal and agricultural uses of pesticides and fertilizers to maximize production, the Global Water Partnership has been advocating the adoption of IWRM principles and concepts, in water management both at macro and micro levels, specially in the developing countries. The developed countries have already exploited their water resources to the maximum extent based upon the pre- IWRM situation and they have nothing much to adopt the IWRM principles. However developed countries who are mostly the donors to the establishment of Global Water Partnership and World Water Council are propelling this concept for adoption in the developing countries where the population is increasing and considerable harnessing of the natural water resource is still to be done to meet the rising demands.

Though the concepts and principles of IWRM are laudable, it is not easy for the developing countries for translating into ground reality. The IWRM approach prompts the co-ordinated development and management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. This includes more co-coordinated development and management of -

- Land and water,

* Chairman, Sahayog
e-mail : bhavanishankar@hotmail.com

- Surface water and ground water,
- River basin and its adjacent coastal and marine environment
- Upstream and down stream interests

But IWRM is not just about managing physical resources, it is also about reforming human systems to enable people-men and women as well to benefit form those resources

For policy making and planning taking an IWRM approach requires that:-

- Policies and priorities take water resources implication into account including the two way relationship between macro economic policies and water development, management and use,
- There is cross sectoral integration in policy development,
- Stake holders are given a voice in water planning and management with particular attention to securing the participation of women and the poor,
- Water related decision made at local and river basin levels are inline with or at least do not conflict with, the achievement of broader national objectives, and
- Water planning and strategies are integrated into broader social, economic and environmental goals

Advantages of an IWRM approach helps in solving problems faced by many countries. The usual problems are drought, flooding, ground water over draft, water borne diseases, land and water degradation, ongoing damage to ecosystems, chronic poverty in rural areas and escalating conflicts over water. The solutions to such problems may fall outside of the normal perview of the agencies tasked with addressing them, and usually require co-operation from multiple sectors. In such cases, an IWRM approach makes in identifying and implementing effective solutions

much easier. It also avoids the all too common situation where solving one problem creates another.

IWRM avoids poor investments and expensive mistakes- further it helps in getting the most value for money from investments in infrastructure- it helps in allocating water strategically. In addition it improves water use efficiency and acts as a tool for change.

The basic IWRM principles are derived from the Rio-Dublin resolution adopted on water and sustainable development by the international conference
on water and environment held in 1992 at Dublin. They are -

1. Fresh water is a finite and vulnerable resource, essential to sustain life; development and environment- since water sustains life effective management of water resources demand a holistic approach, linking social and economic development with protection of natural ecosystem. Effective management links land and water uses across the whole of a catchment area and ground water aquifers.
2. Water development and management should be based on a participatory approach involving users, planners and policy makers at all levels- the participatory approach involves raising awareness of the importance of water among policy makers and the general public- it means that the decisions are taken at the lowest appropriate level with full public consultation and involment of users in the planning and implementation of water projects.
3. Women play a central part in the provision, management and safeguarding of water-this pivotal role of women as partners and users of water and guardians of the living environment is seldom been reflected in the institutional arrangements for the development and management of water

resources. Acceptance and implementation of these principles requires positive policies to address women's specific needs and to equip and empower women to participate at all levels in water resource programs, including decision making and implementation, in ways defined by them.

4. Water has an economic value in all its competing uses and should be recognized as an economic good- within these principles, it is vital to recognize first, the basic right of all human begins to have access to clean water and sanitation at an affordable price. Past failure to recognize the economic value of water has led to wasteful and environmentally damaging uses of the resource. Managing water as an economic good is an important way of achieving efficient and equitable use and of encouraging conservation and protection of water resources.

The above principles define ideal contexts and to reach that state, many developing countries find it hard to translate them on the ground, in the given conditions that have evolved from centuries of their existence particularly in South Asian countries like India, Bangladesh and Sri.Lanka where democratic institutions are yet to take deep roots and are in varying degrees of success unlike most of the Western countries. More over, these countries have centuries of hoary civilizations that have evolved with age old traditions coming from millenniums. Even in Pakistan where there is authoritarian rule currently and in Nepal with its monarchy, it has not been able to take roots despite the governmental support that is not so evident in the three former countries Religion and caste divisions with rigid barriers still exist causing stumbling blocks. In other countries where benevolent dictatorship exists, to some extent it could be possible to move towards these ideal situations.

However efforts have been made by the country water partnerships prompted by the GWP to promote Area Water Partnerships through the NGOs who are members of the CWPs. But they are languishing due to lack of adequate financial support

and the needed backing by the governments

Reason is that the major stake holders, i.e. the governments and local bodies who implement the development schemes and manage the sources have not come on board in the partnership. Although they have been addressed to come on board, due to their pre-occupations and sectoral divisions working independently, the representatives are unable to participate in the dialogues, even while they are agreeable to IWRM concept. Practical hurdles in their style of working come in the way unless the heads of the governments/local bodies are committed to the IWRM principles. It is the grooved bureaucracy with mindset formed from ages, and lack of political will, find it difficult to change for the radical principles. There are too many different agencies or departments working independently such as agriculture, irrigation, municipal and industrial water supplies, with little linkages and lack of river basin approach for development of schemes. An integrated approach is definitely required starting from the top, cross cutting the various sectors and also a two way consultation both bottom up and top down iteratively to manage the sources efficiently with equity and access to all. Still the top down approach is dominant in the countries.

In India, the NGO efforts have made some head way in establishing water partnerships as in the case of Arwari river water partnership under the Tarun Bharat Sangh and the leadership of Magasasay awardee Rajendra Singh where there is some semblance of IWRM at local level. Similarly, to resolve the Cauvery dispute there is a private effort of the Cauvery Family Water Partnership comprising leading farmers of the two states of Tamil Nadu and Karnataka under the guidance

of Madras Institute of Development Studies, Chennai. But not much ground has been covered except bringing some understanding of the problem of sharing. There is very little evidence of IWRM. The NGOs in different states are establishing water partnerships since the last five years, comprising stake holders at different levels developing water visions for a river basin and frame work action plans. In Tamil Nadu, the Tamraparni Water Partnership, in Maharashtra the Purna Water Partnership and the Upper Bhima Water Partnership and in Karnataka the South Canara Water Partnership for Nethravathi river basin are some of the ongoing examples. Except creating some awareness for the need of IWRM, nothing tangible in translating it has been achieved. Similarly in the Central India the Kshipra River water partnership is sluggishly progressing

Apart from the basin water Partnerships, a South India Water Partnership has also been established and functioning for the last two years, for all the Southern Indian States who share large inter-state rivers with basin contiguity, also keeping in view of the fact that the Southern Peninsular Rivers have distinctly different features as against that of the Northern Indian Rivers. The Southern Peninsular Rivers are monsoon fed, non-perennial and flow through harder rocky formations in most of the stretches, attaining mature river morphological conditions. The topographical and physical features are also distinct having poor aquifer-formations with low capacity for ground water storage and recharge. Similar zonal partnerships for the other zones of India are yet to be established.

The experience so far indicates that IWRM to some extent can be done at local levels such as small water bodies as in the case of village tanks. The WUAs in a couple of states have been able to adopt some of the concepts of IWRM but not fully. However it is difficult rather practically impossible in the current conditions at basin level in South Asian countries due to various factors as mentioned earlier, hence not even a scratch has been made.

Water Governance with reference to Area Water Partnerships

* Vidyanand Ranade

1.0 Genesis of AWPs -

World water Council (WWC) advocated the concept of Integrated Water Resource Development and Management (IWRM), which emanated from the four principles enunciated in the International conference on Water & environment held in Dublin in 1992. IWRM could be defined as a process, which promoted the coordinated development & management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner, without compromising the sustainability of vital ecosystems. Global Water Partnership, an executive arm of the WWC undertook the challenge to implement the concept of IWRM through Regional Technical Advisory Committees.

A very well drafted concept, logical in its approach and reflecting collective wisdom of many experts in the water sector, could make impact and show tangible results only if the concept could actually be transformed into concrete actions. South Asia Technical Advisory Committee (SASTAC) Aurangabad deliberated on this issue and initiated proposal to set up Area Water Partnerships, with a view to transforming the IWRM concept into ground reality. SASTAC proposed to try to implement it in a water short basin of moderate size (1000 to 20000 sqkm.) through partnerships of Govt. / Semi Govt. / Non Govt. organizations working in water sector in the study basin.

2.0 Functioning of AWPs -

First step by the AWPs set up in such basins was to study the

* Chairman, Upper Bhima Water Partnership, Pune
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status of water resources development in the basin, assess ultimate WR potential, make projections of various competing demands of water, study all water related problems in the basin, identify shortcomings / lacunae in basic data / information and then through a consultative process of discussions in workshops of partnership members, experts & some stakeholders, prepare a 'Vision document', expressing expectations & aspirations of the people for ideal water related development in the basin. Next step would be to prepare a 'Framework For Action', which would chart a course of actions that would transform Vision into Action.

In most of the developing countries, role of Govt. so far had been that of a provider and it still continues to be so. Most of the water related development schemes are financed from public funds and are executed through Govt. agencies. Water Resource Development schemes are usually investigated, planned and implemented by Govt. agencies. Operation of irrigation systems is carried out by Govt. departments, urban water supply and sanitation is managed through semi-Govt agencies (Municipal Corporations) and industrial water supply is managed through Industrial Development Corporations. Private funding is negligible in surface water development in Maharashtra State and in other States in India. Appreciable investment of beneficiaries is seen only in groundwater development and management (cost of digging well, drilling bore well, installation of pump & recurring cost etc). Funds for the same are raised from personal savings and by obtaining loans from cooperative banks / commercial banks. For the disadvantaged section of the society, many times loans & subsidies are provided for this activity, through several schemes initiated by Govt. Similarly, private investment as above is seen for Lift Irrigation schemes lifting water from reservoirs, canals and rivers. Involvement of stakeholders in the development or management of surface water resources till then was not much. There is some involvement of stakeholders in the watershed development works, which augment

groundwater in the watershed. Water Resources Deptt. of GOM has recently enacted Participatory Irrigation Management Act. Now onwards it has been decided to entrust all management of all existing surface irrigation schemes to the Water User's Associations. This is a major step towards involvement of beneficiaries in the surface water resource management. It is expected to improve efficiency of water-use and achieve more equitable distribution of water.

3.0 Limitations of AWPs –

Area Water Partnerships so formed have studied various water related issues & problems in the basin such as, optimum water resource development, equity in water allocation, social considerations, status of water–literacy, policy of allocation of water for competing water demands, future water-use scenarios, pollution of natural and man–made ecosystems & its implications, requirements of water for nature & ecosystems etc., in an objective, dispassionate manner & by taking a holistic approach. Vision document embodies water resource related optimum & equitable socio-economic development of the stakeholders from the basin.

When it comes to taking appropriate actions to transform the Vision into Action, some limitations & constraints were observed as recorded below.

- AWPs through their NGO partners could initiate actions to make the stakeholders aware about present water–related problems and about the long term adverse effects on the stakeholders due to actions, inaction or incorrect actions by the Govt., semi–Govt. agencies, & Govt. Corporations.
- Once stakeholders were aware of such issues i.e. when water literacy increased in the basin, it was expected that stakeholders would form a strong pressure group to compel the Govt. to modify

the policies for larger interest of the stakeholders or to insist on implementation of existing Laws, Acts & rules faithfully, because usually they are circumvented by influential stakeholders/ politicians having vested interests, to promote their individual agenda.

- This sort of development in the basin is an ideal one. But changing mindset of the stakeholders by increasing their water related awareness and uniting them to take actions on the lines as above for their better and secured future is a very slow process, requiring many years and sincere efforts by dedicated individuals. Main question before AWPs has been to how to galvanize NGOs, professional organizations, academicians and to motivate them to act on above lines. Such actions require involvement of motivated individuals working in a concerted manner for the cause they represent. This is the most difficult activity in the functioning of AWPs.
- Developmental activities in water sector are looked after by several departments of Govt. agencies, Semi-Govt. bodies and Corporations. These departments function usually in isolation and strive to complete physical targets within the outlay provided to their department, by observing their rules & regulations. Except some coordination at the interface of two departments, each department thinks & acts in a compartmentalized manner. There is lack of holistic approach in the functioning of the State Govts.
- AWPs may have some good ideas in improving the situation at least to some extent. But individual AWPs form a very small body to establish a dialogue with the Govt. (several departments of Govt.). Secondly individual AWPs may encounter some and not all water related problems in the study basin. One AWP may have industrial pollution as main problem, second as urban

pollution giving rise to urban – rural conflict and the third may be facing inequity & lack of

social considerations in water resource development.

- In the developing countries where most of the developmental activities are carried out by Govt. / Semi–Govt. agencies, unless the critical issues observed by all AWPs in the State are brought to the notice of Govt. for making changes in the policies, and then passing enabling Acts & rules, governance in the water sector is not likely to improve.
- Findings of all AWPs in a State should be collated and specific practicable

  suggestions should be made to Govt. by a body of representatives of AWPs working in the State. These issues could be discussed with individual departments of Govt. to start with and then finally with all departments working in the water sector. This also is a slow process but it may have some good results.
- Elected representatives of the people are usually averse to adopting long term policies which do not show immediate gains. Their actions are influenced by the demands of people from their constituencies. Vested interests can vitiate implementation of rules & policies. Hence water – literate stakeholders have a very important role to play to secure their water related future. Though it is a longer and difficult path, AWPs would have to initiate suitable actions to make it as short as practicable.

4.0 Conclusion –

Water Governance at present is mostly by the Govt. functionaries as per relevant Acts, rules and executive orders. Participatory Irrigation Management is the first step in entrusting power and responsibility to the stakeholders. Involvement of stakeholders is most vital in implementation

& operation of watershed development works for realizing optimum benefits from it. AWPs, through NGOs can take up this activity. AWPs should educate stakeholders to form a pressure group for better governance of water related issues by the Govt./Semi-Govt. agencies. AWPs should motivate common stakeholders to cooperate and show active involvement for their water future. Reluctance to pay water use charges commensurate with ensuring sustainability in the efficient functioning of infrastructure to provide these services, is another bottleneck. Political expediencies is one of the reason for not revising / raising water rates. AWPs would also find this issue a difficult one to convince to the stakeholders.

It would be desirable to learn from AWPs who have made some headway in bringing Vision into Action. Better practices followed by them could be emulated by other AWPs.

* * *

Water Governance with Reference to Area Water Partnerships

* Ashok R. Jadhav

According to the GWP definition, water governance refers to the range of political, social, economical and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of the society. Thus, water governance is the framework of political, social, economical and legal structures within which societies choose and accept to manage their water-related affairs. It includes governments, the market forces that help to allocate resources, and any other mechanise that regulates human interaction.

Water governance is perceived in its broadest sense as entailing those social, political, economic organizations and institutions and their relationship, which are regarded important for water development and management. Given the complexities of water use within society, managing it effectively and equitably entails ensuring that the disparate voices are heard and engaged in decisions over common waters. The political aspects of water management are to be acknowledged and faced in the road ahead. Effective water governance of water resources will require the combined commitment of governments and various groups in civil society, particularly at local/ community levels, as well as the private sector.

Government play an important role for ensuring equitable and sustainable water resources management. Although they set the overall policies and laws for development, management and use of water resource, they cannot operate in isolation. For successful implementation, they

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need to involve all users of water in the process of developing appropriate policies and regulations for water resources management and use. Establishing this "enabling environment" involves not only the creation of the right policy frameworks to appropriately allocate and manage water among competing uses and for regulating water quality, but for ensuring there is adequate capacity and accountability within regulatory and management institutions to correctly implement these policies. Legislation on water rights and benefits must be included especially to peruse strategies for integrated water resources development and management that take account the needs of the poor.

Above all, governments need to ensure the participation of all stakeholders- including both public and private sectors in the process of creating new and modifying existing, legislation. Importantly, governments have a significant role in developing co-operation at all levels among those shoring water basins.

Achieving effective water governance is a political process and needs to be undertaken in the context of integrated water resources management. The IWRM approach requires that decision- making process be developed to the lowest appropriate level capable of handling such tasks. Area water partnership, a multistakeholder common platform will prove to be the suitable institutions to implement IWRM on ground.

All government agencies, responsible for water resources development and management will have to be the partner institutions of the Area Water Partnership. The non government organizations, Educational Institutions, Agriculture Universities, Financial Institutions, Agricultural marketing committees, Agro-based small scale industries, co-operative banking institutions will have to be the partner institutions in the functioning of AWPs. 53 partners institutions coming together establish Purna AWP. The main government agencies from purna basin in the functioning of Purna AWP are as below

- Water resources deptt. (WRD)
- Water supply and sanitation deptt. (WSSD)
- Geological Survey and Development Authority (GSDA)
- Agriculture deptt.
- Dr. Panjabrao Desmukh Agriculture University, Akola
- District local government (Zilla Parishad)
- Central Ground water Board (Govt.of India agency)

Purna AWP has been established with full co-operation of these agencies. These agencies became the partner institutions of purna AWP on their conscious decisions at local level. The roles and functions of these, and the various tiers of authority need to be adjusted accordingly. To build effective institution action is required to ensure community participation and representation from all water users involved in these processes.

Building human and institutional water resources capacities is important for the sustainable development and management of water resources. Decision makers, water managers and users need for example, to increase their capacity to manage limited water resources taking into account increased user demands and environmental needs, to develop appropriate tariff structures that takes into account the needs of the poor, to raise the revenues required to sustain both the services provided and the resources its elf, and much more

Getting the political process right is the key towards effective water governance and successful implementation of IWRM Only when water resources are managed in ways responsive to social and economical needs and to long-term sustainability of the water resources will be the goal of water security is achieved. And that is what the Governance Dialogue sets out to do: address how to get the enabling environment and institutional arrangements right.

At the district level in Maharashtra state, District planning council (DPC) is the planning authority headed by District Guardian Minister. The Collector of the district is the member secretary of the District planning council. Members of Legislative assembly of the district, Members of Parliament of the district, and few representatives from level people are the members of the DPC. The yearly plan of development is prepared by DPC by compiling the development schemes from each department from the district within the available financial resources made available by State Government. This plan in prepared for one year only and long term planning of development of the area is not done by DPC. IWRM principle is not implemented in this process as individual agency submits its developmental plan to DPC. Administrative and financial discussions definitely took place in the meetings of DPC, but no discussions took place with approach of integration of natural resources such as water, soil and to develop other resources as power and food grain. Poverty Alleviation programme are independently executed with sectoral approach. Long term and Medium term planning is required to eradicate the poverty of the area by adopting the process of planning with participatory approach with integration of all natural resources especially water and soil. Existing water Governance has to be strengthen to fulfil the criteria to adopt IWRM principle with co-ordinated efforts. AWP being the prerequisite to adopt IWRM on ground, the strengthening the formation and functioning of AWPs by support of government will be welcomed in this regard. AWP should have an autonomous functioning and not to be governed by government's. Enactment but only to support by governments. The government partner institutions of AWPs shall implement the framework for action plans formulated by AWPs. Regular Dialogue between AWPs and policy makers at heads of the governments would be useful in implementation of IWRM to eradicate poverty of the area.

National water policy, 2002 declared by Government of India,

states as below:

Participatory Approach to Water Resources Management

Management of the water resources for diverse uses should incorporate a participatory approach; by involving not only the various governmental agencies but also the users and other stakeholders, in an effective and decisive manner, in various aspects of planning, design, development and management of the water resources schemes. Necessary legal and institutional changes should be made at various levels for the Purpose, duly ensuring appropriate role for women. Water Users' Associations and the local bodies such as municipalities and gram panchayats should particularly be involved in the operation, maintenance and management of water infrastructures / facilities at appropriate levels progressively, with a view to eventually transfer the management of such facilities to the user groups / local bodies.

The procedures to implement the principles laid drown in the national water policy has to formulated in detail.

Government of Maharashtra declared it's state water policy in 2003.

Water resources Department, Govt of Maharashtra has passed farmers participating Act in 2003 to involve Water users association in Irrigation Management. This is exactly the action, which has been done by Govt. of Maharashtra, which is very encouraging in the area of implementation of IWRM on ground. This can be said as the important step in implementation of IWRM. Integration of planning process of surface and ground water, maintaining water quality of surface and ground water and control over there, controlling industrial pollution in surface and ground water are the major issues to be brought under integrated approach with long term planning at local as well as at higher authority level.

We are in need of "Integrated Natural Resources Management "

(INRM),(Water, Energy ,Soil and Agriculture: WESA) principle to do the overall development of the area to eradicate the poverty

Integration of policies should also be considered while thinking of implementation of IWRM on ground. Water Policies may spell out only water resources development. The energy policy may spell out the development and management of energy only. Agriculture policy may spell out the development of agriculture development only. Integration of polices of natural resources such as water, soil, energy and agriculture should be done in the form of " development policy" and long-term developmental plan shall be prepared based on this development policy on the principle of IWRM. The suitable governance in all these areas will be the requirement of today's to think for the eradication of poverty from the area.

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MUSI RIVER PARTNERSHIP (MRP)
PHIRANGI NALA AREA WATER PARTNERSHIP (AWP)

(The life line of livelihood for 55 villages in the Himayatsagar catchment, Ranga Reddy district, Andhra Pradesh)

* M. S. Kodarkar

1. Basin management is starting point in Integrated Water Resources Management (IWRM) :

River Basin Management (RBM) is globally accepted concept as there is greater realization that impacts of activities in the basin of any water resource has profound effect on the latter. Further, River Basin Organizations (RBO) are considered as starting point under Integrated Water Resources Management (IWRM) plan. The sub-regions of a river basin are further covered under the theme of Area Water Partnership (AWP), a concept introduced by Dr. M.A.Chitale, recipient of prestigious Stockholm Water Prize and a globally acclaimed water expert.

2. Osmansagar and Himayatsagar :

The two drinking water reservoirs of Hyderabad have vast catchment of 736 sq.km and 1340 sq km respectively. A part of Deccan plateau the area comprises of two hydrogenic environments; Granitic terrain and Lateritic-Basaltic terrain. The run-off has been found varying from 35 to 52 mm/yr under normal annual rain fall of 800 mm in this region.

3. Phirangi nala - The life line of irrigation :

Taking advantage of land slope the area was scientifically exploited

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for surface water harvesting by (a) impounding water of Musi and Isa rivers to construct impoundments named Osmansagar and Himayatsagar respectively.

Apart from these reservoirs, a number of small and big impoundments were also created to take full advantage of surface water run-off. Phirangi nala is one such lentic ecosystem. It originates from the anucut across Isa (Musa) river at villege Chandanvelly, Chevella mandal, Ranga Reddy district of Andhra Pradesh. The stream has total length of 74 km and finally ends in to Ibrahimpatnam tank near Hyderabad. Named after British called locally as Phirangis, the nala sustains irrigation in vast tracks and also is feeder channel apart from Himayatsagar to many smaller irrigation structures locally called Kuntas and cheruvus along its course. Phirangi Nala which is spread across an area of 74 Kms covers a vast area of Ranga Reddy District and suburbs of Hyderabad city. The nala is the one of the important feeder channels to the Himayat Sagar which caters to the drinking water need of Hyderabad city.

Geo-morphologically the nala can be divided in to three zones.

Zone1: extends between Chandanavelly village to Shamshabad. This zone is predominantly, rural; where agriculture is the main activity. The nala feeds many water bodies on the way to sustain the agriculture productivity.

Zone 2: Extends from Shamshabad to Nimmiguda. This zone is peri-urban with some of the major developmental projects such as the ring road and the International Airport coming up near Shamshabad. Due to the fast urbanization, this zone which was predominantly rural, is undergoing fast urbanization. As a consequence of urbanization the land value has gone up and conversion of land use from agriculture to urban settlements has become the major issue. Unfortunately water bodies are the first victims of this anthropogenic pressure and farmer communities

are the victims. Encroachment of Phirangi nala and destruction of Errakunta is classical example of this avoidable disaster.

Errakunta – A case study :

The case of Errakunta highlights systemic failure[3,5,7] where in spite of political intervention[4] and suitable directions from concern authorities destruction of the water body is going on [1,2,6]. The cases registered under illegal encroachment in this case have gone unpunished [7]. The destruction of Phirangi nala and Errakunta amounts to destruction of livelihood of farmers dependent on these water resources.

Zone 3: Extends from Nimmiguda to Ibrahimpatnam Lake. This zone is again predominantly rural, with agriculture taking up the priority in livelihood. Considering the pace of urbanization of Hyderabad mega-city, the phirangi nala and villege tanks falling under this zone need to be declared as protected as per Water, Land and Tree Act (WALTA).

Needful attention to the following:

- Phirangi Nala, with an extent of 74 Kms, caters to the livelihoods of the farmers in 55 villages across Ranga Reddy district and suburbs of Hyderabad city. ***Ignoring the conservation need of this nala and water bodies dependent on it amonts to ignoring the livelihood needs of the farmers in these 55 villages.***
- Himayat Sagar is one of the two drinking water reservoirs of the Hyderabad city. Phirangi nala is one of the main feeder channels to Himayat sagar. Thereby, its ecological role with respect to the survival and existence of the reservoir itself is vital. Further, ***considering the escalating drinking water requirement of the city, one cannot but attend to the conservation of the nala and its catchment***.

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WATER RESOURCE DEVELOPMENT IN MORNA RIVER BASIN : A STRONG MEASURE TO OVERCOME THE WATER RELATED PROBLEMS OF AKOLA CITY

* Dr. S.M. Dhabadgaonkar

ABSTRACT

The City of Akola (Maharashtra), with its present population of around 4,50,000 is situated on the banks of Morna River, which is a small tributary of Purna River. The city has faced a catastrophic drinking water supply situation during the years 2004 and 2005. As the catchments of Katepurna and other nearby streams have not received rains consecutively for two years, the impounding reservoir at Mahan on Katepurna River, which was contemplated as the principal source of raw water for the city, was almost exhausted. The Mahan water treatment plant (WTP) was run far below its installed capacity of 90 MLD. With the result, the consumers were supplied with marginal quantity of tap water only once in 3-4 days initially (October 2004) and only once in 8-10 days subsequently (June-July, 2005). As the municipal supply was too inadequate to cater for the drinking water needs, people started mining groundwater, despite its brackish character, to fulfill their requirement. A stage has reached when tube wells even up 200 m deep failed to yield sufficient water. Water used to be transported over long distance by Tanker to meet the drinking

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as well as other water requirement in many parts of the city. Many inhabitants preferred to move from the city to their relatives elsewhere. The local administration took several emergency measures to somehow tide over the situation. This also included the ban on Dr. Panjabrao Deshmukh Krishi Vidyapeeth lifting raw water from Morna River for their R&D work related to Irrigated Agriculture. Though at that time the focus of attention was on meeting the crisis, it is now necessary to learn lessons from the instance and plan and implement appropriate measures to avoid recurrence of such situation in future. This paper, therefore, aims to present appropriate long-term strategies for water resource development & management for Akola City and nearby areas to overcome similar difficulties in future. It is a strong case for the people in the Morna River Basin pursue the matter with the administration and ensure its implementation.

INTRODUCTION

The City of Akola (Maharashtra), with its present population of around 4,50,000, is situated on either of the banks of Morna River, a small tributary of Purna River. The City is expected to exceed its population figure of 6,00,000 in the next 15 years. It has experienced an unprecedented drought resulting in a catastrophic drinking water supply situation in 2004 and 2005. The raw water for the city is drawn principally from impounding reservoir at Mahan on Katepurna River. It is treated at Mahan water treatment plant (WTP) having an installed capacity of 90 MLD and transported to the city for distribution over a distance of around 40 km through pipelines. As the catchments of Katepurna and other nearby streams have not received rains consecutively for two years. As a result, the Katepurna Reservoir, which is the principal source of raw water, started depleting at a fast rate. Due to unavailability of adequate quantity of raw water in the reservoir, the WTP was run far below its design capacity of 90 MLD. This provided marginal drinking water supply to the consumers.

The city has a number of privately owned bore wells and tube wells. TDS content of groundwater is well over 1000 mg/L. As the tap water supply was reduced, the people started using groundwater, despite its brackish character. Heavy withdrawals of groundwater resulted in lowering of groundwater table to an extent of complete drying. Many have attempted deepening of wells even to 200 m depth but was only partially successful.

During October 2004, the tap water was supplied to the consumers only once in 3-4 days. As the scarcity of water increased day-by-day, tap water supply was reduced. During May-July 2005, the consumers were given marginal supply of tap water only once in 8-10 days. In many parts of the city, tankers are deployed to distribute the water. People even resorted to using nearby polluted water sources for other household needs. The local administration under the leadership of Akola Collector, especially with the help of Maharashtra Jeevan Pradhikaran, taken several emergent measures to somehow manage the situation during the scarcity period. These measures included:

1) Revival of abandoned water supply systems for Kapsi and Kaulkhed reservoir waters.
2) Laying and commissioning in record time, 300 mm dia. PVC pipeline to transport treated water from Chohota (Wan Scheme Water) to Akola.
3) Supply of potable and non-potable water by tankers in different areas as needed.
4) Clamping ban on deepening tube wells for undue abstraction of ground water.
5) ***Ban on lifting raw water from Morna River by Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola for their R&D work related to Irrigated Agriculture.***

The City experienced some relief only in August 2005, when it received its first rains. Though at that moment of time the focus of attention was on meeting the emergency, it is now necessary to think of appropriate long-term measures to avoid the recurrence of similar situation in future. This presentation, therefore, aims to suggest appropriate long-term strategies to eliminate similar difficulties in future.

IMPORTANT FEATURES

In this section, the different features that are relevant in planning and implementation of appropriate strategies are briefly outlined.

Geography

As outlined earlier, Akola city is situated on either side of the banks of Morna River, which is a tributary of Purna River. The Morna River Basin (MRB) up to Akola is principally occupied by basalt. Immediately downstream of the Akola City, the region is occupied by alluvium. Along the principal drainage course of Morna River, the river slope from South to North is quite gentle (approximately 1/1000).

Rainfall &Runoff

Jeyaseelan et al (1996) have noted that the average annual rainfall at Akola (Elevation 282 m above MSL) is 800 mm. Further, in reference to Purna River Basin as a whole, about 90 % rainfall is received during monsoon period (June-October) and 60 % of the total rainfall is received during July and August.

The Central Water Commission, at selected locations (Lakhpuri, Gopalkhed and Yerli), is continuously collecting information on rainfall, runoff, silt-content and quality of water in the Purna River. Average annual rainfall in Purna Basin varies from 750 mm in the lower reaches to 1700 mm in the upper reaches. The general average rainfall in the Purna River Basin is 825 mm /year. The surface flows are negligible up to an annual

rainfall of about 500 mm and rainfall in excess of this contributes about 30-45 % as surface runoff (Jeyaseelan et al 1996). The sediment load varies with the intensity of the rainfall resulting in first flood, subsequent floods, rising flows, receding flows etc. The sediment load carried by the flow during non-monsoon period is less than 1 %.

Sanitation

At the moment there is no underground sewerage system for Akola City. The septic tank effluents, along with the other wastewater (Sullage), flow through the open drains. Open defecation is rampant. Solid waste management is not up to the mark. Due to all these factors the wastewater that eventually joins the Morna River is highly polluted. However, as it is available throughout the year, it can be utilized for groundwater recharge in a sustainable way.

PRINCIPAL REASONS FOR THE CATASTROPHIC SITUATION

In order to eliminate the recurrence of similar situation in future, it will be necessary to trace the reasons that manifested the severity of the problem leading to the catastrophic condition of drinking water supply. These are outlined below:

Acute Rainfall

It is clear that the acute rainfall consecutively for two years (with virtually no rains in the second year), had pronounced influence in intensifying the problem.

Single Source Dependence

The infrastructure for water supply to the city was augmented from 25 MLD to 90 MLD. However, it is from the same source i.e. from Katepurna Dam. The earlier arrangements from Kapsi, Kaulkhed etc have been abandoned, as they were no longer required after augmentation of the water supply from Katepurna Dam. The catastrophic scenario that emerged clearly explains the disadvantage of full reliance on the single source.

Wastage of Water

Wastage of water due to leakages and unauthorized connections is a common feature of all the cities and Akola is not an exception.

Non-availability of Adequate Natural Groundwater Reserves

Due to complete reliance on Katepurna source, groundwater development was not carried out. The available groundwater, despite its brackish character (TDS > 1000 mg/L), was abstracted by the people in the initial period as they started experiencing shortfalls in their normal piped water supply.

Municipal Sanitation

The city does not have a sewerage system. The inhabitants have their

own septic tanks, individually or collectively. The wastewater mixed with the effluent of septic tanks is carried in open drains and eventually joins Morna River. Open defecation is rampant. Solid waste management system is not to the mark. Due to all the causes the city harbours polluting environment.

Evaporation Losses from Impounding Reservoirs

Evaporation losses from impounding reservoir increase in summer at much faster rate for the following reasons:

1. High temperature in summer compared to other seasons,
2. Reduction of relative humidity in the air above the water bodies,
3. Increasing '*Surface Area / Volume*' (A/V) ratio for the same volume removed from the reservoir,
4. Increasing '*depth*' for the same volume removed from the reservoir,
5. Further increase in A/V ratio due larger demands compared to winter and monsoon seasons.

PROPOSED LONG-TERM STRATEGIES FOR AKOLA WATER SUPPLY

1) *Groundwater Resource Development in Morna River Basin:*

Despite the fact that Drinking Water Supply Schemes based on surface water (Katepurna, Kapsi, Kaulkhed etc) are specifically built and maintained for the city drinking water supply, these have proved to be inadequate, as witnessed from the recent catastrophe.

Under the circumstances, the development groundwater resource may be advisable to provide a complimentary source to meet drinking and other water needs in the region if the contingency like this is to be faced any time in future. It should be noted that groundwater is a vital source of water supply, especially in areas, where dry summers or extended droughts cause stream flows to discontinue.

The Advantages of Groundwater

The advantages of groundwater may be summarized as:

- Ø No large storage structures are required to be built as for surface water.
- Ø Evaporation losses are totally eliminated.
- Ø The bacterial quality is superior to surface, except where the sub-surface water is polluted.
- Ø It is generally clear and does not require elaborate treatment, except the chlorination and fluoride removal in fluoride bearing stratum.
- Ø It can be made available without pipelines anywhere in the water-charged region.

In the context of Akola City, adequate evidence is available to justify developing groundwater resource in Morna River Basin. There is a dam on the Morna River around 30 km u/s of Akola. However, all the water available in this project is reserved for irrigation purposes.

Fortunately, the stretch of around 30 km from the dam to the Akola City is available for groundwater development. The groundwater development structures shall be in the form of 15-20 barrages (1.5-2.0 km apart) holding a shallow pool of water around 1.5-2.0 m in depth. Fig.-1 shows the proposed groundwater development in Morna River Basin, schematically.

The exact location of the barrages will have to be decided taking into account various factors such as topography, hydrology, geology and other engineering aspects.

Rough estimates given in Table-1 reveal that additional groundwater reserve of 48 Mm^3 (Million Cubic Meter) can be made available from Morna River Basin in the region 30 km D/s of Morna Dam and U/S of Akola City. This groundwater storage can serve the city at least for 4 months at the rate not less than 100 Lpcd. For this purpose, it is necessary to adopt inter-disciplinary and integrated approach in planning and implementation of the programme, since expertise from several agencies will have to be pooled. With concerted efforts, this programme can be completed within 12-18 months.

2) *Rooftop Rainwater Harvesting*

The rooftop rainwater harvesting by individual houses or Organizations, Offices etc can substantially reduce the problem in future.

3) *Recycling & Reuse of Wastewater for Agriculture and Groundwater Recharge*

As a matter of fact, from the point of view of pollution control, the domestic sewage from Akola Municipal Corporation Area needs a provision of separate sanitary sewerage system and a full-fledged sewage treatment plant to be able to discharge the treated sewage effluent into Morna River D/s of the city. However, until such a system can be provided, it is desirable and possible to provide partial treatment to the city Sullage.

The domestic wastewater released in Morna River from Akola City is going to be available in a sustained way. Full advantage can be taken of this sustained availability of this source of water for agriculture and groundwater recharge after due treatment. Dr. Punjabrao Deshmukh Krishi Vidyapeeth (PDKV) at Akola is in dire need of an unfailing source of water for their R&D Programmes. This is an added advantage qualifying urgent attention of the State of Maharashtra and all other concerned to undertake Recycling & Reuse of Akola municipal wastewater, along with the groundwater development project.

The Proposal

This proposal comprises following components:

1) Construction of Interception works across Morna River D/s of Akola City to intercept the DWF.
2) Construction of Intake structure to accommodate sump & pump House on the Right Bank of the Morna River.
3) Rising Main to transport the Sullage to DPKV area for partial treatment, which shall comprise:
    a. Screening
    b. Grit removal
    c. UASB Reactor or its modified version
4) Treated effluent holding Pond
5) Chlorination of treated effluent

4) Pumping Out Saline Water for Reducing Brackishness of Groundwater

The philosophy of rejuvenation of the saline groundwater tract by freshwater comprising long-term controlled pumping of saline water from upper 5-6 m zone of shallow groundwater coupled with freshwater recharge has been advocated by Dhabadgaonkar in the Year 1992. The example of Chedkapur cited by him in his paper and the scenario subsequent to the

completion of experiential project sponsored by Vidarbha Statutory Development Board (VSDB) and undertaken through the Groundwater Survey & Development Agency (GSDA), Maharashtra State amply substantiated the philosophy. Therefore, it is evident that in conjunction with the measures cited above, pumping of saline water from D/s of Akola City (at location X in Fig.-1 and Fig.-2) will also be useful to reduce the brackishness of the groundwater in the region.

Table-1: Estimate of Storage & Availability for Water Supply

Details and Quantity	**Unit**
Approximate Basin Dimensions	
L	30 km
B	**8 km**
D	**4 m**
Porosity	**0.10**
Volume	96 Mcum
Leachable Volume 50%	48 Mcum
Present Demand	
120 Days Demand @ 100 L/c/d	
Population	450000
Water Supply	100 pcd
Days	120 d
Quantity	5400000 cum
	5.4 Mcum <<
	48 Mcum
Future Demand	
120 Days Demand @ 100 L/c/d	
Population	600000
Water Supply	100 Lpcd
Days	120 d

Quantity 7200000 cum
7.2 Mcum <<
48 Mcum

The above calculations show that the basin will be able to meet easily the drinking water requirement of 6,00,000 population @ 100 Lpcd, in the event of similar catastrophic water supply situation, if encountered in future.

CONCLUSIONS

1) The city of Akola, having a population of around 4,50,000 at present, recently faced a catastrophic situation of drinking water supply.

2) Though at that moment of time the focus of attention was to meet the emergency, it is now necessary to plan and implement appropriate measures to avoid the recurrence of the situation in future.

3) Following *LONG-TERM STRATEGIES* are outlined for consideration and implementation by the planners and the decision makers to avoid recurrence of such a situation in future:

- Ø Groundwater Resource Development in Morna River Basin between Akola City and Morna Reservoir.
- Ø Rooftop Rainwater Harvesting in Akola City.
- Ø Utilization of Municipal wastewater for agriculture and groundwater recharge after treatment, especially for Dr. Punjabrao Deshmukh Krishi Vidyapeeth (PDKV) at Akola to be able to uninterruptedly continue their R&D work on irrigated agriculture.
- Ø Undertaking long-term, pumping of saline water from D/s of Akola City to reduce the brackishness of the groundwater in the region.

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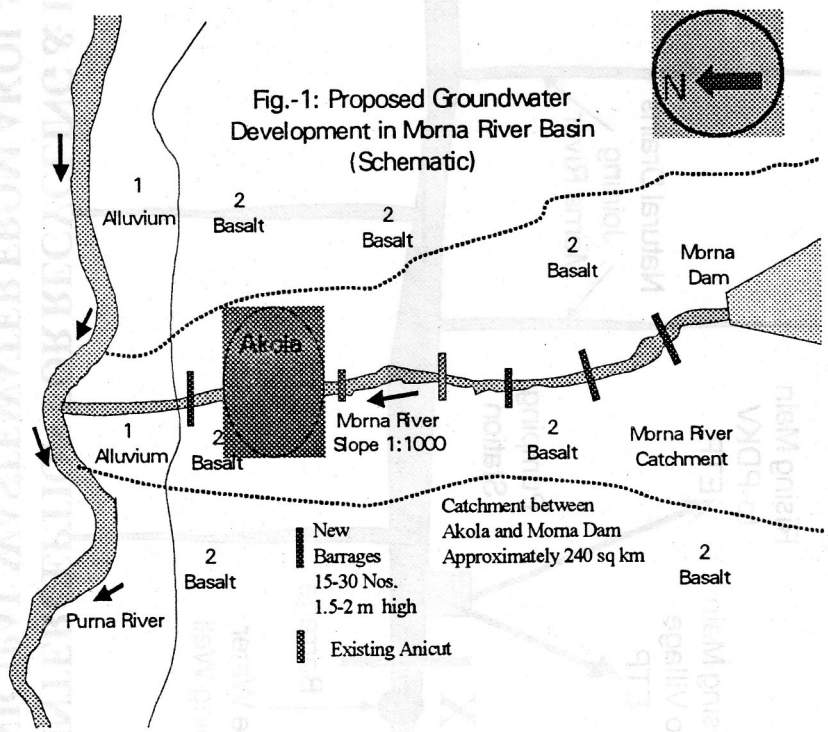

Fig.-1: Proposed Groundwater Development in Morna River Basin (Schematic)

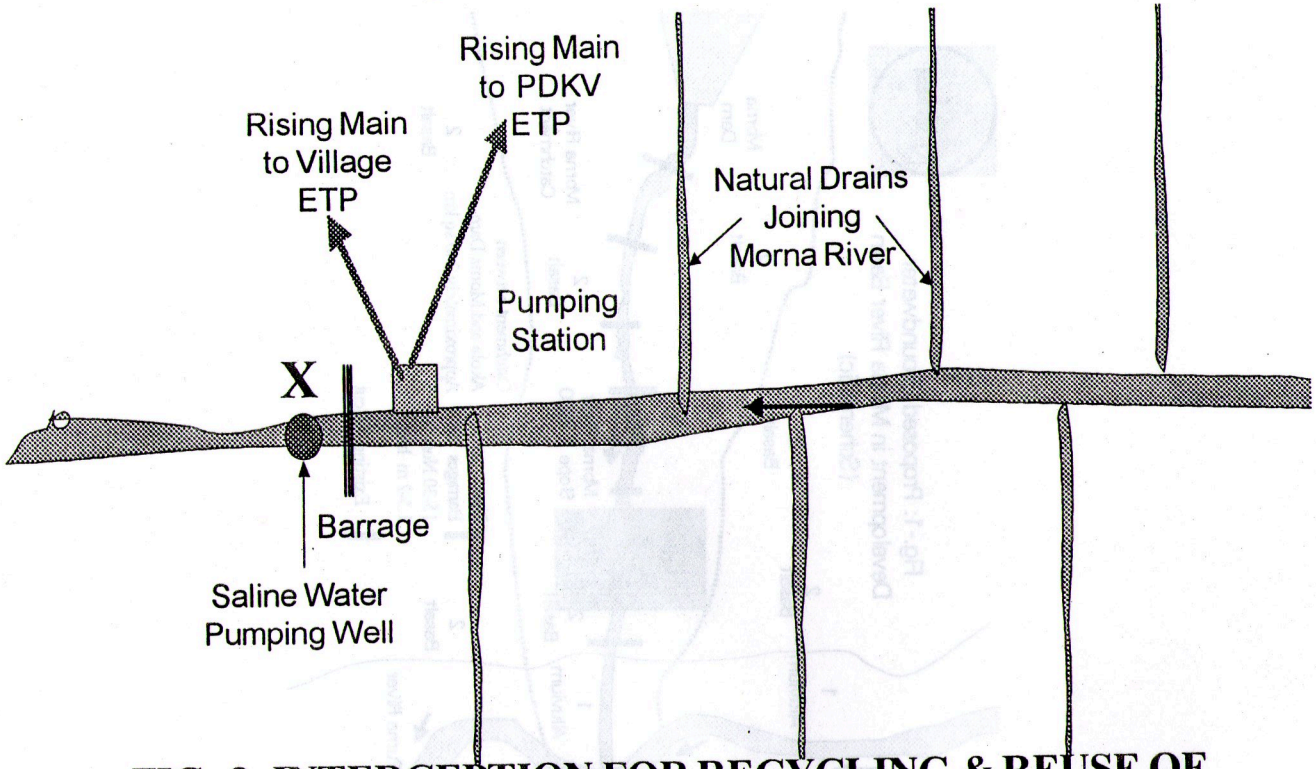

FIG.-2: INTERCEPTION FOR RECYCLING & REUSE OF MUNICIPAL WASTEWATER FROM AKOLA CITY

Area Water Partnership - As a Instrument for Promoting IWRM at Local Level

* Ashok R.Jadhav

IWRM is a process, which promotes the coordinated development and management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

This principle can be brought in to action on ground by adopting multidisciplinary approach in process of water development and management involving users, planners and policy makers at all levels.

Government play an important role for ensuring equitable and sustainable water resources management. Although they set the overall policies and laws for development, management and use of water resource, they cannot operate in isolation. For successful implementation, they need to involve all users of water in the process of developing appropriate policies and regulations for water resources management and use. Establishing this "enabling environment" involves not only the creation of the right policy frameworks to appropriately allocate and manage water among competing uses and for regulating water quality, but for ensuring there is adequate capacity and accountability within regulatory and management institutions to correctly implement these policies. Legislation on water rights and benefits must be included especially to persue strategies for integrated water resources development and management that take account the needs of the poor. Above all, governments need to ensure the participation of all stakeholders- including both public and private sectors in the process of creating new and modifying existing,

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legislation. Importantly, governments have a significant role in developing co-operation at all levels among those shoring water basins. The IWRM approach requires that decision- making process be developed to the lowest appropriate level capable of handling such tasks. Area water partnership, a multistakeholder common platform will prove to be the suitable institutions to implement IWRM on ground.

Government agencies are responsible for development management of water, soil, agriculture and engineering resources. The overcall development of the basin is only possible by adopting implementation of principle of integration of all these natural and artificial resources.

In Government working the development of water resources is allocated to water resources deptt. Like wise Agriculture, Energy, Water supply and sanitation, Ground water Survey and Development Agency (GSDA) and so on. The current practice of implementation of Projects/ Schemes is to prepare the plans of the schemes by the concerned responsible agencies and then to implement it after approval from the appropriate authorities. The local Government i.e. Zilla parishad at district level, municipal councils at urban level are made responsible for the small schemes.

It is very essential to coordinate all these individual developmental agencies from state, central and local Govt. and the NGOs working in that fields to integrate the water resources development with soil and agricultural development, water supply schemes, ground water development projects and others.

In Purna River Basin (PRB) because of existence of saline ground water in the area of 4860 sq.km. in three districts namely Akola, Amaravati and Buldhana district of Maharashtra State in nearly 350 villages. The availability of fresh sweet potable water is the main problem of that area.

The second main problem of Purna River Basin in the presence

of alluvial deposits over 7500-sq.km areas with plain topography. Water resources development structures were not taken up because of unavailability of sound strata for foundations for the civil engineering structures and there are no natural sites for the creation of artificial storages in this area of alluvial deposits.

Third main problem of this area was development of agriculture sector because of non-availability of water for irrigation and presence of salinity in soil.

Above three main problems needs to be resolved with coordinated efforts of all concerned agencies comming on a common platform to implement the principle of IWRM on ground.

In 1995 Friend's Forum for Purna River Basin Development (FFPRBD), Akola, the NGO, came forward to look into the matter basically to identify the basic needs and problems of the peoples of the saline track of purna basin (PB). Series of Consultative local meetings with the people from villages were taken to identify the issues to be tackled on priority.

Issues Identified in these Consultative Local meetings were as below

- Drinking water problem because of salinity in ground water
- Non-availability of Surface & Ground water resources for agricultural development.
- Effort on agricultural development because of presences of salinity in soil.
- Health of people and livestock because of salinity.
- Maintenance of old village tanks, as these tanks were source of drinking water, which were feeding sweet water through ground to down stream wells in old days.

The Main Key stakeholder from Govt. agencies regarding these issues were identified as below

- Water supply and sanitation dep't. (State + Local Govt.)
- Ground water survey and Development Agency
- Central Ground water Board.
- Water Resources Deptt. (State and Local)
- Agriculture Deptt.
- Dr. Panjabrao Deshmukh Agriculture University
- Water conservation Deptt.

FFPRBD then organized workshops to discuses the probable solutions to resolve these issues inviting the solution from all concerned agencies and involving interested NGOs like APMC Akot, Urban Co-op Bank Akot,Vanarai Amaravati and others.

Vishveshwarayya National Institute of Technology (VNIT) Nagpur had also initiated the dialogue with all concerned agencies on a common platform by way of organizing symposium.

In 1997 GSDA had carried out an experiment of dewatering the saline water from the tube wells with financial support from Vidarbha Statutory Development Board Nagpur (VSDB) on the request and persuasion of FFPRBD.

The workshop on " Study of Problems of Salinity in saline track of Purna Basin and its solution" was organized in 2001 inviting all the concerned agencies to present their future strategies to resolve these issues.

The discussions on common platform of FFPRBD Since 1995 exchanges the views and ideas of the planners and implementers of the schemes which were proved to be the instrument to integrate the resources to find out sustainable solutions. FFPRBD being the host institution of Purna Area Water Partnership were the common link to all these major key stakeholders.

The integration of surface and ground water, surface water from

non saline track to saline track, integration of pumped saline water with fisheries development, integration of saline soil with saline resistance crops and other horticulture crops, creation of water storages in saline track to use for agricultural development by micro irrigation system were the areas to be integrated with each other.

Purna Area Water Partnership (PAWP), then with consultation of all 53 partners institutions formulated Purna River Basin Water Vision: 2025 in which the strategies to be adopted to resolve the issues in the time frame up to 2025 are stipulated.

Following Vision statement was adopted unanimously:

Safe and potable water requirement for people and cattle in the entire basin and especially in saline ground water belt of PRB will be fully ensured on sustainable basis. Pollution from domestic, agricultural and industrial sources shall be minimized, controlled and maintained bellow the acceptable limit through improved/ appropriate methods including recycling and reuse of water for domestic, agricultural and industrial purposes.

Poverty in PRB will be eradicated and living conditions of all people will be uplifted to sustainable levels of health and well being by improvement in agricultural practices and development of industrial culture, inter-alia through integrated water resources management of Purna River Basin with special emphasis in its saline ground water belt.

On the basis of Water Vision: 2025, the Framework for Action (FFA) up to 2025 was formulated. The Short-term, Medium-term and Long-term programmes were planned for implementation up to 5 years, up to 10 years and up to 2025 years.

The key stakeholders for implementation of these programmes were also identified in the Framework for Action.

Purna Area Water Partnership/FFPRBD were pursuing Government Since 1995 to appoint High power committee to prepare master plan of Purna Basin with integrated approach to resolve the issues. Govt.of Maharashtra had then constituted the High powers committee in 2000 and report has been submitted to Govt in 2001.

Purna Water Partnership was the instrument in PRB to bring all the developmental agencies on common platform to prepare their developmental programmes with integrated approach.

The developments that may be regarded as the Milestones in the Process towards the mitigation of the problem are highlighted in italics.

1) International Conference on " rural water Supply and Sanitation for Developing Countries" organized by the Indian Water Works Association at Nagpur, January 1992. This event was instrumental to emphasize and focus more attention to the drinking water supply problem in saline groundwater belt of PRB.
2) Workshop on " Groundwater Recharge" organzed By Indian water Resources Society at Amravati, during February 1993. This event helped to consolidate the people's support and will towards solution of the problem.
3) Beginning of GSDA's exploratory pumping exercise at Dapura n September 1993 and the encouraging results available in the next 18-month period.
4) Formation of Purna Khore Vikas Mitra Mandal (PKVMM) (February 1995 with its subsequent Registration in the year 1997:Registration No. F/5197Akola/1997)
5) Constitution of Vidarbha Statutory Development Board (VSDB) in 1995 and creation of " Puma River Basin Development Committed (PRBDC)" there under (1995).
6) Symposium on, " Integrated Approach to Management of Water & Soil of Purna River Basin with Special Reference to Salinity

Characteristics" February 2-4. 1996 organized by VRCE Nagpur with Vidarbha Statutory Development Board Nagpur as the Principal Sponsor.

7) Interim Report and Recommendations by Purna Khore Vikas Samiti (PKVS) to VSDB, 2nd February 1996.
8) Sanction of funds by Vidarbha Statutory Development Board Nagpur for the GSDA Salinity Alleviation Project (ASP) (1996-97)
9) Implementation and monitoring of the SAP By GSDA
10) An interim appraisal by PRBDC (1997) of the work carried out by GSDA.
11) A Regional Workshop for Sarpanch/ Farmers in the belt at Daryapur by PKVMM (1999)
12) A National Seminar on " Groundwater salinity Water Resource Development and Management of Purna Alluvial Basin" Organzed by Government College of Engineering Amravati (January 1999). This has been a good indication of the interest generated in the area where the problem exists.
13) Constitution of an Expert Committee by the Water Supply & Sanitation Department Maharashtra Government during January 1999, under the Chairmanship of Prof. H.B. Ulemale to review the SAP of GSDA.
14) Report of 2nd Water Commission under the Chairmanship of Dr. M.A.Chitale was submitted to the Govt. of Maharashtra. This report outlines in details the recommendations for PRB.
15) A Meeting by the Hon. Chief Minster Shri.Vilasrao Deshmukh at Mumbai on 16.2.2000.
16) Constitution of a High Power Committee (HPC) under the Chairmanship of Hon. Smt. Vasudhatiai Deshmukh, following the above meeting. Shri.A.K.Shenolikar, president FFPRBD, Shri. Bhaiyasaheb Deshmukh Secretary FFPRBD and Shri. Shivajirao Deshmukh, Member FFPRBD were the Members of the HPC.

17) Sanction by Maharashtra Govt. to the Mega Regional Rural Piped Water Supply of MJP for 158 Villages and Two Townships in Saline Groundwater Belt of PRB during August 2000.
18) Report of Sub-Committee by Hon. Shri.Harshavardhan Deshmukh, Chairman VSDB under the Chairmanship of Dr.B.G.Bathkal, to review the GSDA SAP. Dr. S.M.Dhabadgaonkar, Vice President FFPRBD and Dr. P.G.Adyalkar, Treasure FFPRBD were the members of this Committee amongst the others.
19) Constitution of Purna River Basin Water Partnership (PRBWP) under the guidance of Dr. M.A.Chitale, Chairman SASTAC By FFPRBD.
20) Workshop on "STUDY OF PROBLEMS IN SALINE GROUNDWATER BELT OF PURNA RIVER BASIN AND THEIR SOLUTIONS" at Akot on 21-21 October 2001 to develop and formulate PRB Water Vision - 2025 and Framework for Action (FFA) documents.
21) Submission of Report of PRBWP to Government of Maharashtra in October 2001.
22) Submission of Report of High Power Committee to Government of Maharashtra in November 2001.
23) Presentation of the Case Study of PRB to World Bank Representatives at Aurangabad (December 2001).
24) Presentation of the Case Study of PRB in First South Asia Water Forum at Kathmandu (February 2002)
25) Acceptance of reports of HPC PRBWP and Bathkal Committee (VSDB) by Govt. of Maharashtra.
26) Constitution of Secretarial Committee (Government of Maharashtra) to study the above 3 reports and to prepare implementation Plan.
27) Several Consultative Meetings PRBWP to formulate FFA for PRB.
28) Meeting of Women in Saline Groundwater Belt of PRB by Women's Water Forum to pursue the Government to implement the recommendations of these 3 reports (August 2002).

29) Training Programme by Villagers for implementation of integrated Watershed Management Programme in 15 villages in Akola District by Vanrai Mitra Mandal- Youth Organization (September 2002)

Following are the actives carried out by Purna Area water Partnership to co-ordinate all the key stakeholders to implement IWRM.

The construction of farm pond in agriculture fields by the farmers under EGS Schemes were advocated by Purna AWP and many farmers came forward to construct the farm pond to harvest rainwater. These farm ponds are also used to develop fisheries development.

Some farmers have developed horticulture in saline track along the banks of Purna River using lift irrigation. Other framers were hesitating to adopt these success stories because of salinity in soil. Purna AWP had tried to convince other farmers to develop horticulture in their field and many farmers are now coming forward to adopt horticulture to suit in saline soil.

Govt of Maharashtra in 2003 issued detailed technical guidelines to adopt it in saline track of Purna Basin and issued elaborate instructions to implement it in three zones of purna basin as below

I) Schemes to be taken in Saline track

II) Schemes to be taken in non saline track

III) Schemes to be taken in Bazada Zone.

Purna AWP was constantly pursuing Central Designs Organization, water Resources Dep't. Govt of Maharashtra to design the barrages on alluvial deposits on purna river to create water storages for agricultural development by using it with drip and sprinkler irrigation system C.D.O. had taken up design work of barrages on purna river and the offices from CDO including Director General, Maharashtra Engineering Research Institute (MERI) and Field Staff had visited the barrages from north India including Barrages on yamuna river at Kanpur.

The joint meeting of DG MERI, CDO, Nashik and office bearer of Purna AWP was held on 9.12.2005 at Nashik in the office of DG, MERI.

He had briefed to the representatives of Purna AWP about the programs on design of barrages on Purna River.

The work of Purna AWP had been presented & discussed at various occasions like

- First South Asia Water Forum SAWAF 1 at Kathmandu, Nepal in Feb- 2002
- First South Asia workshop on Area Water Partnerships in Sept - 2002 at Nagpur, India in which Purna AWP was the main Organizers of this workshop.
- Purna AWP was selected as single AWP by GWP from whole world to present in conference on River Basins in Madrid in Oct-2002 to be presented by chairperson Ms. Margaret Catley- Carlson herself.
- Purna AWP was selected in water action context in poster presentation in Third World Water Forum Kyoto, Japan in March 2003 and poster were presented in 3rd WWF.
- Evaluation study of Purna AWP was carried out by IWP through Mr.Vijay Page, Director, School of Management, Mumbai in Oct. 2005 and report is circulated among all AWPs in India.
- Evaluation study is also carried out by GWP-SAS through Lalit Dessanaike,from International Water Management Institute (IWMI) in November 2005.
- Purna AWP is holding a national workshop on AWPs in Dec 2005 at Nashik, which is sponsored by IWP.

Thus Purna AWP is not only active in development of PRB by way of community building, participation promotion and agenda setting through coordinated efforts with integrated approach.

Purna AWP works as facilitator to provide a common platform to all key stakeholders to share the knowledge and experience to integrate the natural resources like water, soil to develop the financial capacities of

the people from PRB. Purna AWP is trying to become successful instrument in starting to implement IWRM on ground. The process of implementation of IWRM is a continuous process and success of implementation of IWRM on ground can only be viewed over a long period of 20 to 25 years or more.

Partner Institutions in PRBWP for enabling a comprehensive approach to the management of water represent all the following sectors.

1) Water Supply and Sanitation
2) Irrigation
3) Grass Root Level Community Organizations
4) Media
5) Women Organization
6) Youth Organization
7) Geo-hydrologists
8) Sociologists
9) Politicians/ Administrators
10) Educational Institutions
11) Industries
12) Marketing Industries
13) Scientists
14) Economists
15) Environmentalists
16) Legal Experts

Purna AWP had a 53 partner institutions. The break up is as below.

Govt Organization state	21
Central	03
Tech. Education Institutions	08

Agriculture University	01
Professional organizations	05
NGOs	08
NGO (women organization)	01
Youth organization	01
Marketing & Banking Institutions	04
Private R&D institutions	01
	53

Purna AWP regularly works through steering committee with 26 members having Chairman Vice-chairman, General Secretary and members. Purna AWP is not registered institutions. The FFPRBD, the host institution is registered Institution under charitable Act. The Administrative facilities to Purna AWP is being provided by FFPRBD since 1995. Even though Purna AWP is not registered institution, all the activities such as holding steering committee meeting and other activities are carried out as per the by-laws of FFPRBD. The expenditure statement of Purna AWP is maintained by FFPRBD –Purna AWP account. The main reason for not registering Purna AWP is to provide convenience to become the member of AWP to Govt agencies. The activities of becoming a member of any registered institution to Local Govt. office is not allowed and permitted in existing rules and regulations of the Govt and therefore there are no any registration fees to be paid for registering any Govt/Non Govt. institutions. It becomes easier to all local Govt. Offices to send their nominations to become the members of Purna AWP.

Achievement of Purna AWP after 2002

- Construction of farm ponds has been initiated.
- Technical Guidelines has been issued by Govt. for saline, non-saline, and bazada zone.

- Govt sanctions the Renovation of village Tanks and construction of new village Tanks.
- Dr. Panjabrao Deshmukh Agriculture University had initiated many packages for saline belt.
- Special Designs of Barrages on alluvial deposits on Purna River.

Future Programme

- Construction of barrages on Purna River
- Agriculture development through MIS using water from these barrages.
- Renovation of village Tanks on large scale
- Implementation of integrated water shed development programmes
- Construction of farm ponds under EGS on large scales.
- Adoption of Horticulture development on saline soils
- Adoption of fisheries development in farm pond and in village Tanks.

References:

1) Integrated water Resources Management: GWP Publication
2) PRB Water Vision: 2025
3) Frame work for Action for PRB
4) High Power Committee Report
5) Agenda note of workshop on " Study of Problems of Salinity in PRB and its Solution" in Oct.2000

* * *

Roof Top Rain Water Harvesting Technique Before 100 years - Case Study of Chikhaldara city in M.S.

* Aruna Sabane

Water harvesting, in scientific terms, refers to collection and storage of rainwater and also other activities aimed at harvesting surface and ground water, prevention of losses through evaporation and seepage and all other hydrological studies and engineering interventions, aimed at conservation and efficient utilization of the limited water endowment of physiographic unit such as a water shed.

In general, water harvesting is the activity of direct collection of rainwater. The rainwater collected can be stored for direct use or cane be recharged into the ground water.

Rain the first form of water that we know in the hydrological cycle, hence is a primary source of water for us.

Rainwater harvesting is practised since historic times all over the world and in India too. There are many forts and prestigious buildings where the emergency and routine water requirements were met from the rainwater harvesting. Off late, due to spread of pipe water supply policy in urban areas and later in rural areas too, the rainwater harvesting culture vanished expect at few regions like arid and hilly areas.

Growing population and increasing consumerism has put heavy pressure on the water supply schemes. Per capita consumption of water has increased with time and water requirement for agricultures, industrial and recreational needs have also increased with same pace.

The Government is managing the water supply schemes through local bodies.

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However, it has its own limitations. Civil societies therefore to be activated so that adequate water supply is ensured to every body throughout the year even during the droughts.

Women is the victim in the circumstances of water crises. Woman has to manage the water even though there exists piped water supply scheme. The time schedule for distributor of water even in big cities is in odd hours even in nighttime, and it is in irregular schedule. The Women has to be alert daily about the timings of water supply in their areas and routine work of women gets disturbed because of scarcity of water in domestic water supply scheme.

Roof top rainwater harvesting can resolve the issue of water crises in domestic use of water. Indivisional house owner in his premises to use for his family can store rainwater. The housing societies can harvest rainwater in their housing complex and can be used by the members or their society.

This rainwater can be used for all purpose other than cooking and drinking purpose. Water storages for piped water supply schemes are the major dams and they are away from the cities using that water.

If we propose to use less quantify of such purified water stored in major dams, to be brought from long distance, then over all cost of piped water supply scheme will be reduced comparatively.

Creating water at the hands can always be a economical solution and it can be possible by way of adopting roof top rain water harvesting technique at each roof, which might be of indivisionals or of civil societies.

In 1898 such efforts had made during British era in chikhaldara city of Amaravati district of Maharashtra State. Roof top rainwater harvesting scheme for storing 4.25 lacks

Litres of water were constructed to store the roof water of treasury building of city. Even today, the scheme is in operation and the people of the city are using the water.

Adoption of this technique can be a solution to a solution to minimise the water scarcity problems in domestic water supply and also would be a step ahead to provide a relief to the women.

Surface Water Quality: A case study of River Godawari presented by Upper Godawari Area Water Partnership.

* Dr. Mrs. A. A. Verulkar

Introduction:

The Upper Godawari Area Water Partnership was established on 24th August 2002 with JDC Bytco Institute of Management Studies & Research Nasik as the host Institute. The AWP took many projects like Training Secondary School Teachers for creating water awareness among School children, training NSS students to construct small dams in nearby villages etc. One of the projects undertaken by the AWP in collaboration with Hydrology Dept. Nasik was Identifying Hot Spots of Pollution along Godawari River on 8th & 9th Jan 2005. Around 250 students participated in the survey & a report has been compiled.

Water Quality:

The water of even the healthiest rivers & lakes is not absolutely pure. All water, even if it is distilled, contains many naturally occurring substances, many bicarbonates, sulphates, sodium, calcium etc.

They reach the surface and ground water from

- Soil, geologic formations in the catchment area.
- Surrounding vegetation & wildlife.
- Precipitation & runoff from adjacent land.
- Biological, physical & chemical processes in the water.
- Human activities in the region.

Of all the above, human activities which increase water pollution need to be addressed properly.

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Human Health & Water Quality:

Plentiful supplies of good drinking water resources are a precondition for good human health. Water related illness – typhoid fever, cholera, dysentery – are very common where good drinking water resources are not available. Waste & waste water treatment, the development & enforcement of drinking water guidelines, public health practices & education – are few of the initiatives, which may be taken to ensure supply of good drinking water. In India & other developing nations 80% of their diseases are water related of serious concern today are the toxic chemicals that enter our water from many different sources including industry, agriculture and home. Little is known about the effects substances on human health, often the effects do not become noticeable for long periods of time and it is difficult to distinguish them from the effects of other factors that impact on our day today life (e.g. nutrition, stress, air quality). Much more remains to be done to control toxic chemical pollution. Meanwhile water pollution can be prevented by not misusing water or the land.

Water Quality Objectives and Guidelines:

Water Quality objectives and guidelines are important measures to protect water quality. The two measures are similar in that both describe how much of a substance we, as a society, will tolerate in water. But guidelines and objectives are arrived at and applied differently.

Water quality guidelines are scientifically determined and indicate the maximum allowable concentration of substances for a particular water use such as drinking, swimming etc. These national guidelines serve as the targets for environment protection.

Water quality objectives on the other hand specify the concentrations of substances permissible for all intended water uses at a specific location as a lake or river. The objectives are based on the water quality guidelines for the uses at that location, as well as on public

input and socio economic considerations.

Water quality guidelines and objectives not only protect water users and environment. They also promote sustainable water management strategies.

Water quality – Common man's perception.

We often think of water quality as a matter and taste, clarity and odour and in terms of other properties which determine whether water is fit for drinking. For other uses different properties may be important Pure water is tasteless and odourless. Water is never found in a pure slate in nature. The chemical nature of water continually evolves as it moves through the hydrologic cycle.

For a common man the most important use of Water is for drinking and if the water which is taken in a glass looks clean and odourless, it is taken as pure water. The common man does not understand the other properties which are too technical and perhaps that is reason only a common man pollutes water as much by his activities.

What every individual can do to improve Water Quality?

As the mankind is facing serious environmental problems, each individual effort to protect water quality is vital. Together individual actions can and do make a difference to water quality and the environment as a whole. Following steps may be taken.

1) Avoid hazardous household products:

   Mostly household chemicals are safe to use and are environment friendly. But some have a harmful cumulative effect when they are over used or incorrectly disposed of. The sewage and household waste water when directly thrown in the River, pollutes the river due to these chemicals.

2) Don't use pesticides or other hazardous material in the farm/ garden. Farms on the bank of the river using pesticides and having

outlets directly in the river pollute the river.

3) Don't forget water quality even when you are having fun
   a) Power boats pollute the river through leaks and spills. Consider using sailboat, rowboat etc. If power boat is used, keep the engine in good repair to avoid leakage.
   b) Do not throw wastages like plastic bags, wrappers etc. into the river.
   c) Use only biodegradable soap and take your non bio-degradable garbage with you for proper disposal.
4) Other Initiatives:
   a) Read on environmental issues.
   b) Be ready to change attitude, behavior and expectations.
   c) Use only environment friendly products and methods.
   d) Urge & support municipal action on environmental issues.
   e) Join and support local environmental groups that works to solve environmental problems.
   f) Inform your friends and educate your children.

In short be a responsible consumer - it makes sense.

A Case study of River Godavari

The Godavari River is the most holy river that originates from the mountains of Trimbakeshwar near Nasik in Maharashtra. The River is known as Dakshin Ganga as it flows to the South Nasik the city on the banks and river Godavari is a holy place where devotees from all over the country come to take a holy dip and perform many vedic activities. The Godavari River gets polluted right from the place from where it originates. The people living on the banks of the River carry on many such activities which pollute the river. This adversely affects the health of people on the banks and also population living in the downstream areas which use the

river as a source of water for drinking purpose. Hence, the Upper Godavari Area Water Partnership in collaboration with Hydrology Project Nasik decided to carry on a walkthrough survey of the River with the following objectives.

Objectives of Study

1) To identify hotspots along Godavari and its Tributaries
2) To know the reasons for water pollution.
3) To interact with people residing on the banks of the river and know their problems.
4) To create awareness among people to keep the river clean.
5) To prepare a report of the survey and communicate the same to the Local Authorities.

Methodology

1) The survey was to be conducted from Trikbakeshwar to Saikheda nearly 150 km. Distance. 250 NSS students from 5 colleges in Nashik viz. BYK College of Commerce, NBT Law College, RYK Science College, Arts & Commerce College, Nashik Road and SMRK Mahila Mahavidyalay were identified for the walk through Survey.
2) Training programmes for the students were conducted to train them for the survey.
3) About 40 groups each group consisting of 5 to 6 students were formed to perform the activity. Each was to walks around 5 to 7km. Along the river.
4) Every group was given a questionnaire and was asked to prepare and present the report of their survey.
5) Index map of the River was prepared and handed over to each group so that they reach the location easily.

Findings of the Survey

1) The River is polluted all though 150 km.
2) People residing on the banks of the River are habituated to pollute the river by washing clothes and animals.
3) In many areas there is a no waste water disposal system and hence the waste water comes directly to the river.
4) At some places dead animals are thrown in the river.
5) Nasik being the holy place many temples are on the banks of the river and all types of wastages and Nirmalya goes directly to the river.
6) The Godavari has Gangapur Dam near Village Gangapur 15 kms. from Nasik, when there is no discharge of water all the pollutants thrown in the river get saturated and give a bad odour.
7) At almost all places the colour of water is green or dark green with bad smell.
8) The Hospitals are cleaning the clothes of patients in the river.
9) Solid waste disposal at some places.
10) Industrial effluent along Nasardi River, which is Tributary of Godavari.

Effects of Pollution

1) The people residing on the bank of the River and sometimes lifting directly the water for drinking are suffering from various water related diseases.
2) At some places the strong odour of water has made the life of people living in those areas miserable.
3) The vegetables grown on the banks of river by using the polluted water also are inhygenic for eating.
4) The purification process becomes even more difficult.

5) On the whole a polluted river is not a matter of pride for the citizens of Nasik.

Remedial Measures and Action Plan

1) The cleanliness of River is possible only by public participation and hence a wide scale public awareness programmes needs to be undertaken. The students can be motivated to so such programmes.
2) At many places on the banks of the River wasting places are not provided which should be provided either by the Municipal Corporation or People in the area should be motivated to create the same on their own.
3) The Hospitals, Industries should be penalized and strict watch kept that they are not polluting the River by their Activities.
4) Waste water Treatment plants be set up.
5) Temples on the banks of the river should be compelled to have their own waste disposal system. Some places on the banks of the River are Tourist places and people coming for fun pollute river in many ways.
6) Periodical testing of water is must.
7) Lifting of sand from the river should to avoided.
8) Continuous flow of water is required along the river.
9) On many occasions like Ganesh Festival the river pollution is maximum. People should be convinced not to use river for Visarjan of Ganesh Murti.
10) Quality of river water and maintaining cleanliness of River is just a starting point. From the filteration plant, the water distribution methods also pollutes the water Result is purified water again becomes polluted when if reaches the user. A study of such

pollutants also needs to be done.

11) The overhead tanks of public offices, schools, colleges, residential buildings also is a matter of concern. Awareness on this ground will also be undertaken.

12) Water Quality objectives & guidelines be set up and monitored strictly.

Conclusion

Uptill now the quality of water is supposed to be the responsibility of the local government. People participation was not sought for the purpose. The users also feel that water quality is a technical subject and beyond their understanding. Over the years people are habituated to carry on certain activities which pollute the River and lakes. The AWPs can take up the cause and involve the water users by creating awareness among them that they are the major player in maintaining water quality of the Rivers and Lakes in their own region. In this perspective the AWPs can involve NGOs in the region. It is important for each one of us to act not only for ourselves and our children but for future generations and for other living things sharing earth with us

'***Clean River- Pride of the City***'

AURANGABAD AREA WATER PARTNERSHIP-MIT STATUS REPORT.

* M. M. Dharwadkar

1. Description of AAWP-MIT

Aurangabad is the fastest developing industrial city in the sub continent of Asia. The geomertical industrialistion growth since 1971 is progressively keeping pace with the periodic needs of the industry.This rapid development has put a tremendous stress on the natural resources like water in the area around the city of Aurangabad. The Aurangabad city is located on the ridge between Kham and Sukhana rivers in the lower Godavari basin in the state of Maharashtra rivers .

In view of the further progressive developmental activities of the region for the coming twenty five years,and for the preservation and conservation of the natural resource of the Kham and Suhkana river basin. region an integrated water resource management approach was initiated through the formation of AURANGABAD AREA WATER PARTNERSHIP –MIT (AAWP-MIT)in January 2000 in Marathwada Instituteof Technology(M.I.T.) Aurangabad,at the behest of Global Water Partnership.

Geographical Aspects: Aurangabad Hydraulic Area (AHA) comprises of two sub-basins linked together by the activity of the metropolitan cities and the surrounding area. The AHA activities will be spread over approximately 1346 square kilometers in theGodavari basin covering Aurangabad sub-basin, Gangagpur sub-basin, Paithan sub-basin, in Aurangabad district and a part of Badnapur sub basin in

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the Jalna district. The AAWP will accordingly deal with four water shed areas, designated as below by Government of Maharashtra.(as shown in the map).

1.	GV-49 encompassing	33 villages.
2.	GV-50 .....do.....	38 villages.
3.	GV-51.....do.....	58 villages.
4.	GP-10.....do.....	56 villages.
	Total	185 villages

In the GP-10 watershed area the effluents from the Chikalthana industrial area flows into the Sukhana river. In GV-49 water shed area all the effluents from the Waluj industrial area flow into the Kham river. (Ref Map-1)

Natural Water Resources : Kham river originate in the north of Aurangabad and meets with the Godavari river in the south and has a catchment area of 900 square kilometer and has 50 kilometer running river length. Similarly, Sukhana river flows in the earlier part and meets Dudhana river after flow of 60 kilometers in length.

Working Boundaries : The activity of AAWP will also cover part of Khultabad and Phulambari sub-basin in the North within the catchment area of Girja River because of the hydraulic links.In the South by the Godavari river and Nathsagar lake on it.In the East a part of Dudhana River catchment area,and in the west of the Gangapur sub-basin, the Nagsari catchment area.

CLIMATE : The maximum temperature in the AAWP region is between 37 Degrees to 39 Degrees Celsius, and the minimum temperature are in the range of 9 Degrees to 11 Degrees Celsius.

ALTITUDE : Aurangabad City is 725 meters above the sea level and Paithan, Nathsagar lake, that is the sources from where Aurangabad City gets all the water supply in 500 meters above the sea

level.There is difference of 225 meters. This is one of the major reasons for water being available to Aurangabad citizens at high cost.

Rainfall : The average rainfall in the AAWP is 625 mm,out which about 70% is in the regular monsoon period 25% off all in the off seasons and 5% sometimes after December.

Evaporation Losses : In the AAWP region on an annual bases the total evaporation is 1780 mm out of which maximum evaporation losses are about 300 mm in the month of May and minimum of 110 mm in the month of December.

Natural Water resources in Aurangabad hydraulic area : The water resource available through rain water in this region is on an average 840 Mm3 (Million cubic meter). The surface water volume is about 300 Mm3 and it is expected that about 300 Mm3 water would be available as ground water. From the above itappears that 600 Mm3 water is available and that is per head about 550 cu.m (Cubic meters) is available for the present population of Aurangabad. Thus the AHA falls in the acute water deficient zone.

Geographical Status : The AHA is spread over 1346 square kilometer out of which 138 square kilometer is taken care by Aurangabad Municipal Corporation, that is 10.25% , 240 square kilometers is the mountainous range that is 17.8 %.of the rest 378 square kilometers that is 28 % is non-cultivable land.Out of the remaining 968 square kilometers , 145 square kilometers that is 15% is undulated and 154 square kilometers that is 16% is flat land by the river bed. The total land available for cultivation in AHA is 66,800 Hectares .Surface water resource in AHA : At present the surface water storage in AHA is only 55 Mm3, and ground water use is 47 Mm3. The banks of river Sukhana are flat and do not have very steep gradient hence has a good catchment area.

Integrating Water Resources : Aurangabad being a historic

city has many water resources engineered during Medieval period, and which are still in operating conditions as on today.The AHA will adopted a fusion of the ancient engineering technology for water resources development with the present time water resources development methods to meet the ever increasing demand of drinking water facilities of the region.

Population and water requirement of AAWP-MIT : As per 1991 census, the population of Aurangabad city and cantonment put together has been reported as 6,11,489. However in 2001 it is reported as 11,00,000 that is including the new Aurangabad suburbs of City and Industrial Development Corporations (CIDCO) and it is anticipated that it would be about 30,00,000 in 2021.In addition the rural population of 185 villages which is 5,55,00 in 2001 and will rise to 11, 00,00 in 2021.The current demand for water ofthe rural population is 21 Mm3 per year, against this, the level of supply is estimated to be 42 Mm3 per year. There is a gap of approximately 21 Mm3. In addition the current supply is not acceptable from the stand point of health standard. This will have to be replaced by new supply arrangements.e.g....from the additional village tanks in the neighborhood because much of the unhealthy supply is of polluted groundwater.Wells in the neighborhood of Kham and Sukhana streams have been reported by the Maharashtra Pollution Control Board, Aurangabad Regional office,as completely polluted and has obnoxious smell.A cleaning program for the river flow, supplemented with recharge measure will have to be implemented in a coherent fashion to improve the water availability.There is a considerable scope for "catching" the precipitation in the watersheds.

Their delineation into manageable water shed village wise or for small group of villages will have to be done. This may add to another 10% to the present water availability,still leaving a gap in the supply and demand of the order of 18 Mm3. Drinking Water Demand : The

drinking water demand for Aurangabad city is 150 LPCD,(Liters Per Capita Per Day) and need a supply of 200LPCD to account for the transit losses. The drinking water demand in 2021 would be around 600 MLD or 360 Mm3 per year including the industrial water demand per year. Currently the water supplied to the AHA from the Godavari basin is of the order of 45 Mm3 per year, that is mainly from the Nathsagar to the Aurangabad City. This may increase to 360 Mm3/year to sustain the additional Population. The water supply from Nathsagar is costly and is expected be costlier further because of the increase in energy costs, avenues for at least partially meeting the requirements from other sources will have to be explored, example, groundwater, ancient supply channels, water sheds recharge systems.It appears that at least 20% of the Aurangabad city's demand could be transferred to the new sources.

Waste Water : Waste water which is expelled from the city is 70%- that is 252 Mm3 of the supplied water. As the water supply to the Aurangabad city increases in the future,the waste water coming out of the underground sewers or surface gutters in the city to the sub-basin will also increase. In addition the catchment area will also carry the storm water from the precipitation of the AHA. This will be for high discharge and for a short period of 60 to120 days of the year. All the same ,sullage of total 5.5 to 7.5 Mm3 will be discharged at a uniform rate for the 365 day of the year at an average of 0.9M.cu.m./day that is 10.5 cu.m. average flow per day for 24 hours.

Water Quality Monitoring : Rivers and streams in the AAWP are progressively getting polluted due to the untreated sewage and the sludge and sewage discharged from the residential area is having high concentrations of bio-degradable material of more then 250 ppm (Parts per million) B.O.D (Biochemical Oxygen Demand). This waste water with no sludge utilization will be going to the storage dam lake of Jayakwadi

through the Kham river joining the lake near Bhramangaon and Sukhana storage lake in the Chikhalthana area. This generates a severe problem of pollution of drinking water for the water of Sukhana lake water and Jayakwadi lake water.

The Aurangabad city water supply from Jayakwadi lake has its tapping points on the left bank of the irrigation outlet channel. As there is 90% live storage of Jayakwadi Dam against the gates that is at higher elevation there is a dilution effect on the pollution load coming from Kham river near Bhramangaon. The water supply source point for Chikalthana and Waluj MIDC is at Jayakwadi lake. The water stored on the Kham river is at the confluence of the pollution load coming from Walujand Chikalthana MIDC area. Especially during summer months of normal years,and in the years having very low rainfall, the in coming pollution load is highly concentrated and is voluminously very high.

The solution for minimizing pollution effect in the lake water of Jayakwadi dam coming from the Waluj MIDC head works and Sukhana dam source, coming from the Chiklathana MIDC head works is limited to the extent of being treated with a heavy dose of Chlorination, and to arrange lifting of sludge water and sewage water coming through main streams just prior to FSL (FullSupply Level) level of respective lakes and have small dam (bandhara) for serving about 12 hours flow and arrange pumping of flow water for perennial effluent irrigation up to common delivery chamber and then by canal irrigation. Effluent irrigation of waste water of domestic region with B.O.D of 250 PPM is not harmful for agricultural crops.It has good manure value. However the percolating water goes to the ground and joining the sewage in the region near by effluent irrigated land will be having higher pollution load. One solution is to arrange piped safe water supply to people in this region of effluent irrigated land.

During the monsoon season the storm water discharge is maximum, which would over flow the bandhara and flow to the Jayakwadi lake.The pollution effect will be lesser due to heavy dilution. In case of Sukhana MIDC waterworks, water needs special increased precautionary measure of pre-Chlorination during every monsoon season. Thus it is possible to get about 7.5 Mm3 water for effluent irrigation in catchment area or commend area of Jayakwadi and Sukhana dams.

AGRICULTURE ASPECT : As a result of geometrical progression in the industrialization process considerable agricultural land was converted into "non agriculture land", in AAWP. Industrialization and urbanization gives rise to high demand for water as compared to the rural requirements of water. High value of water brought to Aurangabad from Nathsagar, (in Paithan sub-basin) will have to be put to reuse again in a variety of forms. The most probable reuse could be in irrigation. In broad terms the supply received in 2025 at 7.5 Mm3/year will be able to provide "nutritious"irrigation for 22,000 hectares (that means if 3000 cu.m.of water per hectare is available) after some pretreatment. Soil testing for assessing the suitability of land and a system of yearly rotation irrigated land will have to be proposed as a major program for facilitating reuse as well as ensuring sustainability of the irrigation arrangements.The treated water from domestic and industrial effluents will be used for irrigation purposes.The irrigation potentials of AAWP is about 10,800 hectares done through varies sources such as medium,minor projects and use of ground water. There is considerable scope to develop irrigated agriculture, through ground water and surface water sources. This includes 22,000 hectare through reuse, and 10,800 hectares already through developed sources and additional water available through surface and ground water.This treated water source will be used for intensive utilization of the cultivable land for cash crops like cotton, sugarcane, fodder crops like lucernfodder, jowar, fodder maize, forest crops like

teak, bamboo, catyotrus, cajuria etc. Mixed farming, that is mushroom cultivation, vermiculture, goat farming, fish farming and other activities will be promoted in the AAWP- MIT.2. Key issues of AAWP-MIT

1. To identify the sub-basin based problems related with water resources and management.
2. To help to resolve these identified problems through a co-ordination committee comprising of Government, semi Government, private sector agencies, Academic institutions N.G.O etc.
3. To create workable projects for the development and proper management of water resources of the sub-basin.
4. To promote the demand of equitable distribution of water resources through public awareness programs.
5. To use working solutions to the recurring and concurrent problems through public dialogue and scientific inputs.
6. To high light aspects of the cost of water and water price to be paid by the water users through exhibition, drama, skits and poster presentation in the education institutions.
7. Gender sensitization in the judicious andequitable distribution and utilization of water.
8. Water quality monitoring for safe and potable drinking water to avoid water borne epidemics in the region.

3. Stages of Development ACTIVITIES OF AAWP : (January 2000 to 2001)

3.1 The first workshop on" Future of water resources in the region of Aurangabad " was organized on 12-2-2000 in our institution (M.I.T.) to appraise the general public regarding the need for the concern for the preservation of natural water resources of the region.

3.2 An overwhelming response in was observed during the gender sensitization workshop on " Role and contribution of women in preservation and conservation of water resources"held on 23-7-2000. The women participants in the workshop specified the rural and urban water related problems.

3.3 From the above two workshops a steering committee was formed on 14-8-2000,with the representatives of the above identified organization.

3.4 In order to implement the decision of the steering committee Field workers or service providers were identified through one workshop of N.S.S. (National Service Scheme) Program Officers from the Colleges affiliated to Dr. Babasaheb Ambedkar Marathwada University Aurangabad, on 27-3-2001.

3.5 Women field workers for AAWP-MIT were identified in the workshop conducted on 15-4-2001.

Future Strategies of AAWP : The following strategies will be adopted in three phases for the AAWP activities for the coming five years, that is from 2001 to 2006 and will be replicated with modifications as per the demand of the prevailing situation every five years.

Phase-A — Short term activity

1. Development of water shed in the AAWP and bringing together the group/s of people totake full care and responsibility of the developed water shed, so as to maintain it, so that it will supplement to their prevailing source of income.Supplements could be in the form of, dairy farming, milk productions, poultry farms, fodder for the cattles, and allied activities. Such activities which bear monetary benefits will prevent exodus of migration of rural population in the urban sector.

2. Preservation and rehabilitation of the prevailing water bodies

in the area. Waterbodies like ponds, lakes, wells, rock springs, and the adjoining wet land area is to be selected. With the help of AAWP members and people participation, the selected water body will be treated and maintained for future use. The water quality will be periodically monitored maintaining the Eco-balances.

3. In order to prevent the soil erosion selected trees will be planted this simultaneously help the nesting of migratory birds. The growth of the excessive vegetation can be controlled by cutting small branches of these trees which will supplement to the fire wood requirements of the community.

4.Monitoring of water quality: The local people will be educated through illustrative posters conveying the right message, regarding water quality testing methods. The school teachers, college lecturers be will educated through one day workshops regarding the water quality testing methods.

5. These will be the "service provider" cadre which will be having laison with the head quarters of AAWP-MIT

Phase-B— Intermediate term activity :

This strategy will be concentrating on conduct of water shed educational awareness activity, through the available media like School or college or Zillasamiti notice boards, news paper, slide show, transparencies, hand bills, seminars, workshops etc.

Phase-C— Long Term activity :

The main focus of this activity will be, monitoring the activity of Phase –A, and Phase –B. Periodic updating and modification of the Phase activity in operation.Deleting the reduntand obsolete method in force in the activity. Self assessment of the overall performance of AAWP.-MIT.4.Formulation of VISION – 2025 . A hard copy of AAWP-MIT VISION 2025 WILL BE SUBMITTED ON 23RD Dec2005 in Nasik

5. Frame For Action Document is under preparation and will be submitted along with the Vision document in Nasik.6Partner Institutions and stake holders .

1. Aurangabad Municipal Corporation, Aurangabad .
2. Maharashtra Industrial Development Corporation, Aurangabad Division.(MIDC).
3 Maharashtra Jeevan Pradhikaran Water Supply and Drainage Aurangabad Division.
4. Maharashtra Pollution Control Board, Regional Office Aurangabad.
5. Aurangabad Zilla Parishad.(District Councils)
6. Minor Irrigation Aurangabad Division.
7. Agriculture Department , Aurangabad Division.
8. Aurangabad District Health Services.
9. Dr. BABASAHEB AMBEDKAR MARATHWADA University-National Service Scheme unit Aurangabad.
10. Rotary Club-Metro Aurangabad.
11. Lions Club Chikhaltana, Aurangabad.
12. Water and Land Management Institue Aurangabad
13. Aapulki Samaj Seva Sanastha, Aurangabad.
14. Marathwada Seti Sahaya Mandal.
15. Geoforum Aurangabad.
16. Nisarg Mitra Mandal Aurangabad.

The operational functions of the AAWP-MIT will be carried out by representative of the above organizations hence forward called as PARTNERS .

WATER LAWS AND GOVERNANCE

LEGAL DEFINATION

* M. M. Dharwadkar

LAW: The most general terms for all rules, to which people in society conform,whether by Customs or by enforceable Government Regulations.

ACT: A law made by a competent Legislature.

STATUTE: A written law, as distinguished from a customary law, or law of use and tradition.

ORDINANCE: The order promulgated by the Head of the country, or Governor of the State, when Legislature of that country is Not In session. It is a class of Delegated legislation.

CODE: It is a collection or compilation of Legal principles in one document Or enactment and having relation to One subject matter.

RULE: Shall mean a rule, made in exercise of A power, confirmed by an enactment And shall include, regulation made as Rule under any enactment.

RIGHT: The authority to have, to use, to store, To distribute, to conserve, to preserve, WATER.

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WATER GOVERNANACE

Factors contributing to governance.

Resource constraints due increase in population in geometrical proportions.

Ecology and Environmental degradation.

Improper use of socio-political system.

Globalization process.

Poor participation of stake holder.

Lack of INTEGRATED WATER RESOURCE MANAGEMENT.

System are "Administered" and "Managed".

ADMINISTRATIVE SYSTEM

Emphasis is on input and official procedures, protocols, methods, norms, rules and regulations.

The delay hampers the action.

No action deject and rejects the ZEAL.

MANAGEMENT SYSTEM:

Operates on result oriented outputs.

Output is subjected to QUALITY CONTROL STANDARDS.

Monitors follow-up,with courtesy

Imbibes STRENGHT, CONFIDENCE AND TRUST.

EFFECTIVE GOVERNANCE

Complete participation of the stake holder in policy and decision making matters.

Water user's role in integrated water resource management.

Care and concern to maintain the biodiversity in the region .

Promoting the sustainable development Without comprising the ecosystem.

Determining the cost factor.

Modes of recovering the cost .

Complete transparency in working.

Remaining accountable.

Capacity to for see and predict.

Repsonding to the call of the stake holders.

CONTRIBUTING FACTORS FOR EFFECTIVE GOVERNANACE.

Holistic cross-sectoral humane approach.

Decenteralization of resources, rights, Privileges.

Total involvement of water user.

Simplifications of unnecessary lengthy administrative procedures and protocols.

Transparency in every activity, with the Democratic participation in decision making.

Accountability at every stage of undertaken Activity.

Predictability of probable events with its inbuilt Consequences.

Responsiveness to commitments.

Coompliance and adherence to the prevailing Laws, rules and regulations.

Respecting and honoring the decisions of the court and judiciary.

* * *

Issues in Water Resources Development of Purna Sub-basin of Maharashtra (India)

* D. M. More

The river Purna is a major tributary of river Tapi and thus it forms a major sub-basin of Tapi basin of Maharashtra. It originates from the Ajantha ranges of Sahyadri. It is a west flowing river and travels through four districts of Maharashtra i.e. Amravati, Akola, Buldhana and Washim. Its length up to the confluence point is around 170 km. and average width around 55 km. The geographical area of Purna sub-basin is around 17000 Sq.km., out of which around 7500 Sq.km. is occupied by alluvial soils and almost 4500 Sq.km. of this is saline one. The depth of this alluvial cover varies from 25 to 425 m.

The major tributaries of Purna have been listed as below :

From left : 1) Pedhi, 2) Uma, 3) Katepurna, 4) Morna, 5) Nirguna, 6) Utavali, 7) Mun, 8) Mas, 9)Torna, 10) Dynanganga, 11)Nalganga.

From right: 1) Chandrabhaga, 2) Bhuleshwari, 3) Shahanur, 4) Wan.

The saline tract is spread over 3 districts of Maharashtras i.e. Akola, Amravati and Buldhana. There are around 1000 villages in this saline tract. The rain fall is also good and the soils are fertile and good for cultivation.

The district wise saline areas and other details are as below:

1) Amravati	: 1738 Sq.km.
2) Akola	: 1939 Sq.km.
3) Buldhana	: 1015 Sq.km.
4) Talukas	: 16

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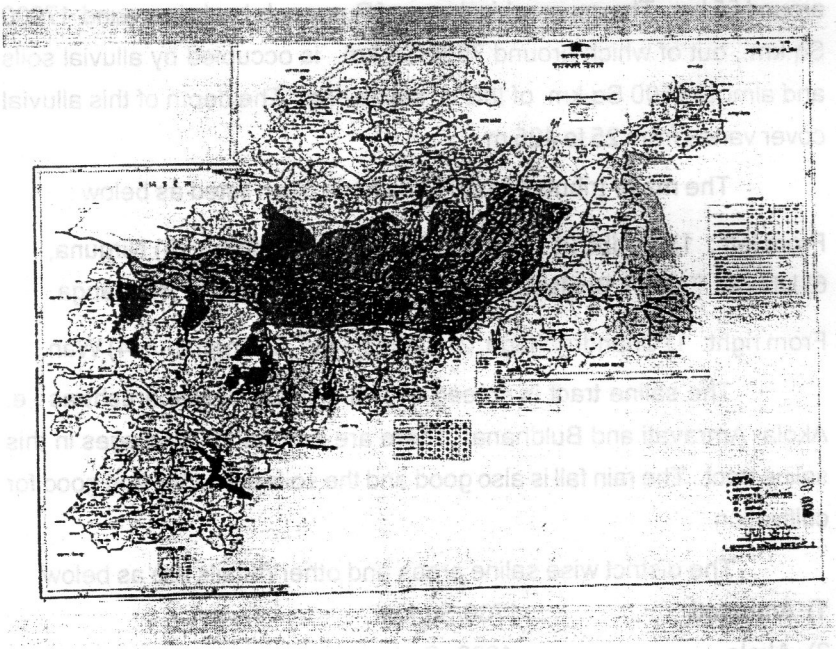
5) Towns : 3
6) Villages : 900 (Approx.)
7) Population : 2 million (Approx.)

The area is famous for cultivation of cotton crop and therefore, the soils are named as Black Cotton soils. The soils are highly impervious and poor for receiving heavy loads of the conventional water retention structures like dams, weirs, barrages and so on. The topography is flat one and it is not conducive for building up water storages. The rainfall varies from 800 mm to 900 mm which straight way drains into the Arabian sea on the west.



Views on Salinity : There are diversified views on the cause of ground water salinity. In the past Purna valley was a part of Arabian Sea connected through Tap river . In course of time because of the tectonic movements followed by silting processes the tract became marine origin. It is also

opined that this inland salinity is primarily caused due to sluggish movement of ground water, low drainage and possible presence of salts in the soil mass. As a result of this, the water which comes in contact with the saline soil-mass gets contaminated with salinity. The thick alluvial belt is underlined by thin layers of sand. These sand lenses are not interconnected and thus from isolated aquifers. The rainfall though quite comfortable the saline terrain therefore, has a low recharging capacity. The acquifers are thus poor and hold little water which is saline in nature. This indicates a total non-reliance on ground water as a resource for development of sub-basin on a sustainable basis.

The top portion of soil with varying depths is impervious. It is also under-lained by sand lenses. The ground water is saline. The complete area with flat slope is totally devoid of tree cover. Trees like Neem, Babul are seen at places. Rainfall is main source of fresh water. The fresh waster which percolates a little bit down also becomes saline. This resulted in the acute scarcity of the fresh water for domestic water supply and irrigation.

The saline water cannot be consumed comfortably by human beings nor by the cattle population. It does not allow the crops to flourish and make the lands more productive. It has thus been a cause of concern for the poor health of the valley since centuries together.

History

The history reveals that almost every village had a tank in ancient days. These tanks used to harvest rain water and store the same on the impervious black cotton soil. The water thus stored was used for the domestic consumption and also for irrigation purposes. There are tanks inside the tanks. The inner tank was used for domestic water and outer for other uses. The inner tank was named as "Mankar nika". People used to have small wells of size 50 cm x 50 cm and depth ranging up to

5 to 6 m. piercing into the sand lenses, with a view to tap the scarce ground water locked up in the poor acquifers in the form of sand lenses underneath. Such small well locally named as ***"Shewadi"*** was seasonal one and used to serve a group of families of 20 to 25 people. These wells were located in the vicinity of village tanks and had a locking arrangement on top for protecting the water inside.

The crops were mostly rain fed. At places there are lifts through manual efforts lifting water from the stored ponds. The main crops are eight monthly Cotton and Tur. During rabi pulses and oil seeds are taken up.

Status of Domestic Water Supply

Over the periods these tanks and wells became non-operational. The population increased, the participation of the people declined and in late 1960s the villagers were supplied piped water by transporting it over a distance of about 100 km. from the underground fresh water zones on north located at the foot of the hillocks of 'Satpuda' range. Such regional water supply schemes did not prove to be effective in the long run owing to the continuous maintenance problems. The leakages in the pipe lines, interrupted power supply, poor upkeeping of pumping equipments and so on made the piped water supply more vulnerable to frequent stoppages. There have been instances of frequent nature wherein people were to live with no sweet/drinkable water for survival for days together. The historical self-supporting system in the form of village tanks and the dug wells was totally uprooted due to severe negligence. People became totally dependant on government run external schemes. The emergency arrangements in the form of water tankers did not cope up with the requirement at all the times. People carry water manually through long distances spending lots of manpower and useful time. Woman folk which is the sole carrier of distant water, suffers heavily. Water scarcity is

witnessed even in the month of October/November i.e. immediately after the monsoon. The situation during the summer is too pathetic.

III Effects of Salinity

- The water is saline, not fit for drinking to human beings and also for cattle population.
- It affects the health of both, reduces the life span and affects adversely on milking capacity, dairy development.
- In absence of fresh water availability both (human beings and livestock) are forced to consume saline water.
- The irrigation is also done on saline water. The crop yield reduces, soils become saline, sick.

Committees

To study the problem of saline water and suggest remedial measures following committees made recommendations to Government:

1) High level committee under the chairmanship of Hon. Smt. Vasudhatai Deshmukh.
2) Friends Forum for Purna River Basin Development.
3) Statutory Board for Vidharbha Development Study by Shri B.G. Badkal.
4) Maharashtra Water & Irrigation Commission Report.

The main recommendations of the committees are given below:

1) To cater to the needs of domestic and irrigation water supplies, works of the type – 1) Village tanks, 2) Percolation tanks, 3) K.T. Weirs be taken on large scale by relaxing the financial norms sizeably.
2) At places schemes to be undertaken in the saline tract without taking in to consideration the economic norms.

3) Renovation of old village tanks
4) Watershed development works.
5) Construction of weirs of stable nature in the saline tract.
6) Irrigation be done by drip and sprinkler methods.

Efforts were also made by GSDA through de-watering the saline water and recharging the area with fresh water. This was however, seemed to be time consuming and expensive also. It may not have long lasting effects. The recharging of saline water to be de-watered is large. It puts limitations on its viability. At places, it has however, been reported that the results are encouraging. This has to be seen in detail.

Action taken by Govt.

All these recommendations were studied by the high level committee at Government level. It was decided to issue the necessary guide lines by the respective departments of State Govt. i.e. I) Water Conservation, ii) Water Resources, and iii) Water Supply & Sanitation. Govt. vide G.R. No. (Marathi) रोहयो-२००२/प्र-२५४/रोहयो-१, दिनांक २१.२.२००४ issued following directives for the over all development of Purna sub-basin related to water resources. The sub-basin was divided into four parts : 1) Bazada Zone, 2) Fresh Water Zone, 3) Saline tract, 4) Ghat area –non-saline tract. The type of works to be undertaken in each of these zones have also been mentioned below

1) Bazada Zone : a) Percolation tanks, b) Percolation canals, c) Earth bandh, d) Cement bandh e) Watershed development works.
2) Fresh Water Zone : a) Cement weirs (small height), b) Bridge cum weir (small height), c) Watershed Development Works.
3) Saline Tract : a) Village tanks, b) Renovation of old village tanks, c) Farm ponds, d) Barrages (weirs on permeable foundations on the lines similar to the barrages in North and South India)., e)

River training works for desalination of surface salinity. f) Watershed development works.

4) Non-Saline Tract : a) Major, Medium and Minor reservoirs, b) Barrages on permeable foundations, c) Watershed development works.

The G.R. further says that :

- There is a need to prepare a master plan for the development of water resources projects for the entire Purna sub-basin.
- The Major, Medium and Minor projects and barrages be undertaken by the 'State Water Resources Department'.
- Works like Watershed development pertaining to water and soil conservation activities, (Percolation tanks, Percolation canals, village tanks, K.T. weirs, River training works, COT etc.) be undertaken by 'Water Conservation Department'.
  - The saline tract is flat, plain. Foundations are deep. There is a scarcity of stones for construction of structures and therefore is a need to formulate new cost norms.
- There is need of two independent circles for initiating the development activities on accelerated basis.
  1) One circle for State Schemes.
  2) One circle for Water Conservation works.

Water Availability

As per Ayangar Committee :

1) Water available in Tapi basin – Total : 11336 mm^3 (400 TMC), Share of :
   i) Maharashtra State - 5424 mm^3 (191.40 TMC)
   ii) Gujarath State - 3928 mm^3 (138.60 TMC)

iii) Madhya Pradesh - 1984 mm^3 (70.00TMC)

2) Water utilised in Maharashtra so far (2005)

By completed projects: 2059 mm^3 (72.651 TMC)

3) Proposed water utilisation for Khariya ghuti and Nawatha.

Total : 2445 mm^3 (86.26 TMC)

Share of:

Madhya Pradesh - 1404 mm^3 (49.53 TMC)

Maharashtra State - 1041 mm^3 (36.73 TMC)

Status of present development

Sr. No	District	Completed Projects	Ongoing Projects	Proposed Projects
1	Akola	29	11	55
2	Amravati	12	06	07
3	Buldhana	33	03	33
4	Vashim	90	12	32

Jigaon Project:

- It is proposed to construct a major dam to utilise 549 mm^3 (19.36 TMC) of water to irrigate 76500 Ha. of land by lift irrigation. At this location the foundations are deep, of the order of 20 m. or so and therefore there is a need to investigate the foundations in more details.

Barrages on Alluvial Foundations

- This is a new kind of structure and therefore its design to be developed afresh. Central Designs Organisation has prepared design for Ner-Dhamana Barrage (Purna Barrage No. 2). The design is in under finalisation. Once this is done, it will solve the problem of all barrages on alluvial soils of Purna sub-basin and elsewhere also.

Soil Parameters for Finalisation of Design Projects

1. Silt factor (f).
2. Modulus of sub-grade reaction (K)
3. Permeability.
4. C – ϕ values.
5. Design flood values, HFL. Waterway etc.

This is being obtained from field organisation.

Irrigation

- Purna river has a flat gradient.
- It has soft banks and deep foundations,
- Geology and topography – not favourable for conventional type of storage structures.
- A chain of barrages on Purna and also on its tributaries could be developed, water stored up to bank level and irrigation done through lifts of small heights.
- Lifts may be private and also Government.
- This is to be coupled with modern irrigation methods.
- Conventional flow irrigation is not favourable as the deep percolation generates saline water in more quantity.
- The filling of barrages could be twice, thrice and so on.
- The storages created in Ghat area in the non-saline zone on the main river and the tributaries will act as backup storages also, in addition to their own irrigation net work.

Roof Water Harvesting

- For drinking water purpose roof water harvesting will be the versatile and reliable solution.
- Each householder should be provided the roof water harvesting system. The participation of the families be undertaken.

- Rainfall being adequate, each family can store fresh water in his own premises, house and use the same over the year.
- A scheme of roof water harvesting is to be devised and implemented on wide scale.

SUMMARY

In a nutshell, the problem of water supply both for irrigation and domestic requirements could be solved on a sustainable basis by resorting to:

1) Construction of Major, Medium and Minor Schemes on priority.
2) Construction of Barrages.
3) Soil & Water Conservation Works.
4) Construction of village tanks and shallow dug wells.
5) Rejuvenation of old village tanks.
6) Roof water harvesting for domestic water.

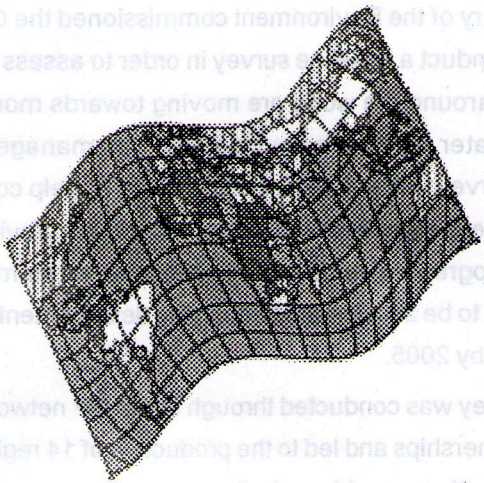
EPILOGUE

The problem of the saline tract can be handled considering the affected area as a part of the entire Purna basin on a holistic basis. There has to be an integrated approach amalgamating the issues of the saline tract with those of the non-saline adjoining catchment. The fresh water of the same sub-basin could be conserved, stored and made available for satisfying the needs of the entire sub-basin. The planning on these lines therefore, appears necessary.

There is also an urgent need to harvest the rain water in the form of village tanks, farm ponds on the impervious surface and utilise them locally for domestic and irrigation purposes. Roof water harvesting will be a sustainable solution for domestic water supply.

* * *

Informal Stakeholder Baseline Survey



Global Water Partnership

VERSION 1

April 2004

Current Status of National Efforts to Move Towards Sustainable Water Management Using an IWRM Approach

Project funded by the Norwegian Ministry of Environment

The Survey – Preface

As a complement to its efforts to support countries to prepare national IWRM and Water efficiency plans by 2005, called for at the World Summit on Sustainable Development held in Johannesburg in 2002, the Norwegian Ministry of the Environment commissioned the Global Water Partnership to conduct a baseline survey in order to assess the extent to which countries around the world are moving towards more integrated approaches to water resources development and management. GWP conducted the survey with a dual purpose in mind, (i) help countries learn from each other's experiences and (ii), at the same time, provide a baseline for monitoring progress towards more sustainable water management, which is expected to be accelerated through the development of the above mentioned plans by 2005.

The survey was conducted through the GWP network of country and regional partnerships and led to the production of 14 regional reports. This material was then used in order to prepare summary documents, including:

(i) the present summary report, on countries' status regarding IWRM approach and related prospects for successful IWRM Plan preparation.

(ii) an annex to this summary report, on countries' readiness in ten specific areas regarded as important for IWRM Plan preparation.

The regional reports, on which the above summary report and annex are based, are not official documents, endorsed by governments. While official views and assessments have been integrated in many instances through the direct participation of government agencies in the GWP multistakeholder platforms and/or analysis of official documents, the end result is to be regarded as "an informal stakeholder baseline survey".

Clearly, the statements made in the reports regarding the level of

maturity of reforms undertaken in the various countries of the world are preliminary and often subjective. Moreover, the "country data" were analyzed at the regional level, with no systematic attempt to harmonize across regions a posteriori. Due to these limitations and the short timeframe of the exercise, some informed readers will probably consider certain statements included in this summary report as inaccurate, partial or subjective. It is sincerely hoped that the views of such readers will be fed back to GWP Secretariat in the form of constructive criticism and will contribute to strengthening the final version of the report, to be released later in the year.

The present summary report (version 1) is released by GWP at the time of CSD-12 along with a Companion Guidance Document to assist countries who are preparing Integrated Water Resource Management Plans. Version 2 of the summary report and its annex, plus full regional reports, will be released later in the year. Compiling the survey would not have been possible without the dedication and responsiveness of all members of the GWP network involved at regional and national level. Their work is deeply acknowledged. The GWP Secretariat and in particular Jacques Rey prepared the summary documents under the supervision of Per Bertilsson with support from GWP TEC. Comments on the present report should be directed to lina.koochaky@gwpforum.org, GWP secretariat.

Finally, the GWP network wishes to acknowledge its sincere gratitude to the Norwegian Government which has commissioned the survey for its outstanding support on such a strategic issue.

Emilio Gabbrielli
GWP Executive Secretary

The Survey – Overall Summary

At the end of 2003, GWP conducted an "informal stakeholder baseline survey" on the status of water sector reform processes in the various countries of the world. The survey was conducted in 108 countries – 45 in Africa, 42 in Asia and the Pacific, and 22 in Latin America.

The survey provides **a snapshot of where countries stand in terms of adapting and reforming their water management systems towards more sustainable water management practices**. The preliminary results show that of the 108 countries surveyed to date, around 10% have made good progress towards more integrated approaches, 50% have taken some steps in this direction but need to increase their efforts, while the remaining 40% remain at the initial stages of the process.

The survey is made of extensive country-by-country analysis that contain a wealth of information on how countries have adapted their way of managing water in order to tackle identified challenges. Kazakhstan, for example, has established eight river basin organizations that cover the major river basins in the country and are responsible for water resources governance and use, plan preparation, water allocation, permit provision, etc. Zimbabwe's Water Resources Management Strategy, initiated in 1995, calls for the adoption of demand management practices such as water pricing, reduction of unaccounted for water, and improved efficiency in the irrigation sector. Nicaragua's Water Resources National Action Plan, completed in 1998, covers a range of issues from legislation and economic instruments to technology. **While some important first steps have been taken, however, in many countries implementation undoubtedly remains an issue.**

The survey indicates that those **countries that have made the most progress towards adapting and reforming their water**

management systems towards more sustainable water management practices have often started by focusing on specific water challenges – such as coping with perennial droughts or finding ways to increase water for agriculture while still ensuring access to domestic water in burgeoning urban areas. South Africa, for example, developed comprehensive policies, legislation and strategies starting in 1994, focusing outward from drinking water and later sanitation, to give expression to the political, economic and social aspirations and values of the new democratic political paradigm.

The survey provides a number of elements allowing an operational assessment of **countries' readiness to meet the 2005 WSSD implementation plan target on IWRM Plan preparation**. In this respect, the level of awareness, political support, the countries' capacity to build on past and on-going processes relating to water related reforms, to rely on existing multi-stakeholder platforms are assessed in the reports.

1. Introduction

This document reports on the outcome of a baseline survey that was carried out to assess the extent to which countries are moving towards more integrated approaches to water resources development and management, as a complement to efforts to support countries to prepare national IWRM and Water Efficiency Plans. This section makes some brief comments on IWRM and IWRM plans to set the stage for the rest of the report1.

Integrated Water Resources Management

One fundamental aspect of IWRM is that it is only an approach towards an end, rather than an end in itself. An IWRM approach seeks to address a country's key water related development problems – water for health, for food, for energy, for environment – more effectively and efficiently than is possible using traditional approaches. It seeks to avoid the lives lost, the money wasted, and the natural capital depleted because of fragmented decision making about developing and managing water resources that did not take into account the larger ramifications of sectoral actions. It aims to ensure that current demands for water are met without jeopardizing the ability of future generations to meet theirs. Overall, it seeks to advance a country's social and economic development goals in ways that do not compromise the sustainability of vital ecosystems.

Integrated approaches imply deliberately moving away from fragmented approaches. On the natural system front, they might involve integration of land and water management, surface water and groundwater management, quantity and quality, upstream and downstream water related interests. On the human system front, they might involve ensuring that policies and priorities take account of water resource implications, that there is cross-sectoral integration in policy development and that

macro-economic effects of water resource development are properly accounted for.

Moving from fragmented to integrated approaches to developing and managing water resources will require change, much of it difficult. Changes will likely be wide-ranging, encompassing institutions and policies, technology and infrastructure, and financial mechanisms.

National IWRM Plans

Simply put, a National IWRM Plan2 is a plan for IWRM – a road map to guide the changes needed to move from fragmented to integrated ways of developing, managing and using a country's water resources, and to accelerate action towards those ends. It clearly establishes the goal posts and the road to achieve them, with milestones along the way. An IWRM Plan therefore must:

- Describe the current way in which water resources development and management decisions are made;
- Outline where the country wants to be in future in terms of decision making in these areas; and
- Map out how it plans to move from where it is now to where it wants to go.

An IWRM Plan should be clearly distinguished from the IWRM approach itself. An IWRM Plan helps a country prepare for the change processes needed in evolving towards an IWRM approach. While IWRM is an approach toward better and more sustainable water management, an IWRM Plan outlines the process for getting there. Whereas an IWRM approach results from a process of change, an IWRM Plan is a time-bound exercise to guide the implementation of such changes.

1 Drawn from "Guidance in Preparing a National Integrated Water Resources Management and Efficiency Plan: Advancing the WSSD Plan of Implementation, Version One, Global Water Partnership, April 2004

2. The Baseline Survey

2.1 Methodology

Process followed

In October 2003 GWP embarked on a survey of IWRM status in the various countries of the world. It was decided to concentrate on countries from the South and to leave a number of countries out of the survey at this stage (e.g. OECD countries). The survey was meant to get baseline information on how far countries had moved towards managing their water resources in an integrated manner. For this purpose, the GWP regional and country networks were mobilized in order to generate country reports highlighting progress made towards better water resources management using an IWRM approach. The country reports were meant to be descriptive and to provide a snapshot of IWRM related policy, institutional and operational developments.

The GWP regional contact persons were given the task to coordinate the production and compilation of country reports at regional level. They were expected to take initiative and structure the regional report as deemed more relevant in their respective regions. A small grant was made available to them in order to get consulting assistance in this task.

Furthermore, the GWP regional contact persons were asked to analyze the country reports along two specific lines:

- Provide **a general, relative assessment of countries' maturity regarding the IWRM approach** in their respective regions. This assessment was to identify countries as having reached three different maturity levels (good progress, some steps, and initial stage) and be qualified by short summary statements based on the survey data.

- Provide **a detailed assessment on the degree of readiness of the various countries regarding the process of preparing "IWRM plans"**, with a view to meet the 2005 WSSD target. This assessment was to be qualitative and substantiated by specific information in ten "areas" seen as important building blocks for developing an IWRM Plan.

Main sources of information

The sources of information used for writing the regional reports and the names of the main authors of these reports are provided in appendix. Contact emails are also included for direct feedback to the regional groups responsible for the survey.

Limitations

As clearly stated in the preface, **the survey remains a qualitative exercise**. The assessments made reflect the best judgments of senior professionals drawing primarily on the accumulated information available within the GWP networks at regional and country levels. The use of a common normative grid describing the "essential components" of IWRM would have brought greater robustness in the analysis, but perhaps at the expense of the diversity of situations and perceptions.

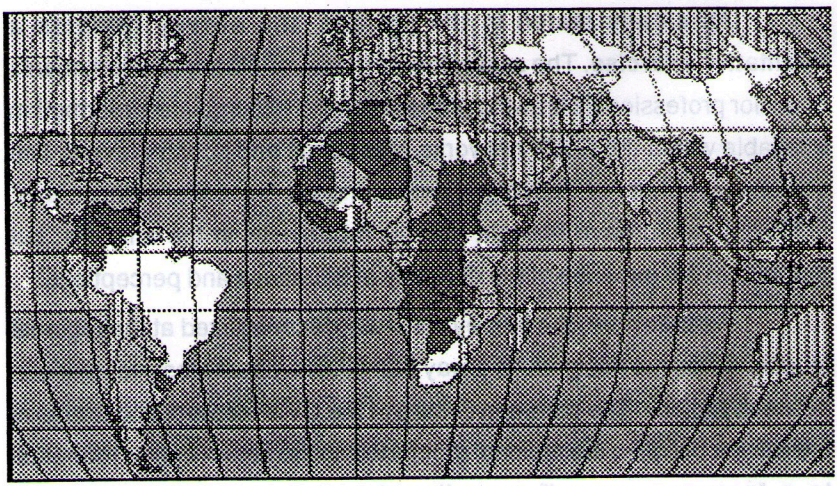
Furthermore, the survey was fully decentralized at the regional level and was not designed in a way that allows robust cross comparison between regions. The common culture of the GWP network and the close interaction between the regional groups within the network allow reference to a "common ground" regarding the analysis of national water management systems and interpretations, but clearly, **the results below should be seen in the context of regions, and not a worldwide comparative analysis**.

[2] The term "IWRM Plan" is used in this report as shorthand for an integrated water resource management and efficiency plan.

2.2 Overall Summary Results

As stated above, and considering the fundamental limitations of the survey, the countries have been identified as having reached different levels of maturity relating to the adoption of an IWRM approach. Countries having made good progress are pictured in white, countries having done some steps are represented in light grey and countries remaining at the initial stages of the process leading to more integrated decision making in the field of water resources management are shown in dark grey.

A summary map and table for all regions surveyed in the world is presented below.



Region	Number of Countries	Good Progress	Some Steps	Initial Stages
Africa				
GWP Central Africa	7		3	4
GWP Eastern Africa	5	1	2	2
GWP Med. (North Africa)	5	1	3	1
GWP Southern Africa	12	2	5	5
GWP West Africa	16	2	4	10
Total	*45*	*6*	*17*	*22*
Asia and Pacific				
GWP Central Asia	8	2	4	2
GWP China	1	1		
GWP South Asia	6			2
GWP South East Asia	8		4	4
GWP Pacific	18	2	8	8
Total	*41*	*5*	*20*	*16*
Latin America & Carribean				
GWP Carribean	6		6	
GWP Central America	7	2	3	2
GWP South America	9	1	5	3
Total	*22*	*3*	*14*	*5*
Total	**108**	**14**	**51**	**43**

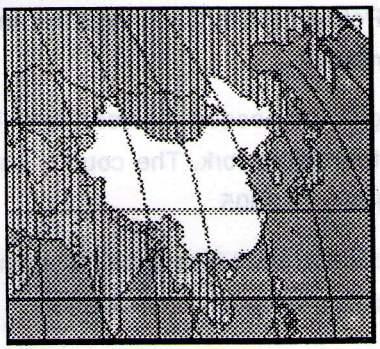
3. Summary of IWRM Status by Regions

As stated above, the GWP regional contact persons were asked to provide a general, relative assessment of countries' maturity relating to the adoption of an IWRM approach in their respective regions. This assessment was to identify countries as having reached three different maturity levels (good progress, some steps, and initial stage) and to be qualified by short summary statements based on the survey data. These statements were aimed at capturing countries' status and related prospects for successful national IWRM Plan preparation. The underlying rationale was to put countries' readiness towards achieving the 2005 target within the perspective of their present status regarding adoption of an IWRM approach.

While the information collected for the survey did include rich materials regarding the practical steps undertaken in countries towards an IWRM approach, this information was not collected on the basis of a common analytical framework, allowing rigorous comparison between countries or regions. Nevertheless, in their respective regions, the regional experts were indeed able to come up with an overall assessment of countries' present status and related prospects for successful national IWRM Plan preparation. These assessments are considered as a reasonable basis for indicating the countries' maturity in terms of adopting an IWRM approach and are presented in-extenso in the tables below (levels and summary statements).

There is some disparity regarding the level of details and information contained in the country summary statements below. It is of course planned to provide the regional groups with an opportunity to revise these statements in the second version of the present document, after an overall feedback on this version is received.

South Asia



Countries that have made good progress towards more integrated approaches.

Countries that have taken some steps towards more integrated approaches but need to increase their efforts.

Countries that remain at the initial stages of the process leading to more integrated approaches.

IWRM status and prospects

Bangladesh The National Water Policy and IWRM Plans are in place.Well on its way towards IWRM approach. Need to include the basis of a democratic system in the Plan preparation process.

An enabling environment exists to support the country's IWRM process and building the political will. The country needs to formulate water laws and a regulatory framework.

Capacity building of the water institutions is essential to achieve IWRM and water efficiency plans by 2005. This could be achieved with some technical and financial support.

Bhutan The draft Bhutan Water Policy is awaiting the approval of the Government. Cross-sectoral and multistakeholders involvement in water resources management to be initiated. An enabling policy and legal environment for effective water governance exists. Can achieve IWRM Plan within 2005 with some support.

Guidance is needed in general governance issues of GOs, NGOs, and, Cross-Sectoral approaches.

India First steps have been taken by Ministry of Water Resources. The country has adopted National Water Policy in 2002. Cross-sectoral and multistakeholders involvement to be initiated.

Common policies and strategies are needed. Sector reform is needed with institutional and regulatory framework. The country can achieve IWRM and Water Efficiency Plans by 2005.

Maldives The country has formulated Vision 2020 Strategies for setting national priorities for waterresources management and development.

External assistance is needed to formulate the country's IWRM and Water Efficiency Plans.

Nepal Preparations of national water plan since 1993 with draft ready in 2004. Reform towards IWRM needed. Can be a successful case.

Pakistan IWRM process going forward, with water sector strategy, public involvement, and multistakeholder platform.Water is at the top of the government agenda.Water sector reform has started. With some external support, the country can achieve IWRM and Water Efficiency Plans by 2005.

Sri Lanka Governance structure in place, new water law, based on IWRM, to be approved by parliament in 2004.Water sector reform has started. Some technical and financial support is needed to achieve the country's IWRM and Water Efficiency Plans.

Status of Patalganga Area Water Partnership (PAWP)

* Madhura Bedarkar, Mumbai

Description of PAWP and key issues of AWP

The Mumbai Centre, Indian Water Works association (IWWA) launched PAWP in 2002, which has received representation from governmental and other developmental agencies, local community and corporates.

The river Patalganga rises at Godbad mountain in the north Sahyadri ranges in the district of Raigad at an elevation of 518 m. It is a typical west flowing river in the state of Maharashtra. The average rainfall in cathment is 3000mm with average runoff of 2500 mm. The total length of the river is 54 sq. km, draining a catchment of 940 sq. km. Since 1910, it has been receiving tailrace water from a neighboring hydropower station, turning it into a perennial river.

A number of industries were established in the catchment area during post-independence period. The perennial flow also attracted a few authorities and two ports. This culminated into buzzing industrial activity, which led to severe water pollution. The villagers, who were earlier dependent on river for drinking purposes, have been deprived of a reliable source and now, are provided with tanker water supply. This situation clearly highlights that the qualitative water stress has led to a quantitative one. This necessitated the stakeholders in the hydraulic area to come together. PAWP published 'PAWP: Vision 2025' and is in the process of formulating the 'Framework for Action' (FFA) document. Besides the 'Vision Elements', which are discussed later in this paper, the Vision document also describes the present situation in the context of stakeholders.

E-mail: madhuja22@yahoo.co.in

Key issues of PAWP

Besides the severely deteriorated water quality, following issues in Patalganga river basin were identified:

- existence of multiple stakeholders such as agriculture, domestic, industrial, livestock, hydropower, in-stream uses, etc, resulting into fragmented planning.
- multiple institutions involved in various aspects of basin planning and management, resulting into lack of integrated planning
- absence of a single authority to look after the allocation of resources,
- inadequate water supply schemes,
- incomplete sewage treatment plant,
- disposing off of inadequately treated industrial waste water in river
- inadequate arrangement to collect, store and dispose off industrial hazardous waste
- lack of planning to utilize other local water resources

PAWP appointed a Steering Committee containing representatives of stakeholders. It meets at regular intervals to review and monitor progress and discuss planned work.

Activities PAWP

- Meetings of the core-group
- Meetings of the Steering Committee of PAWP
- Field visits to catchment area
- Accumulation of data information
- Preparing literature to create awareness about PAWP (notes, background/research papers, questionnaires)

- Conducting workshops for stakeholders
- Representing PAWP at important forums
- Establishing dialog with stakeholders

Stages of development

- PAWP was formed in year 2000
- Steering Ciommittee was being formed
- For the purpose of formulation of Vision 2025, PAWP organized two Stakeholders' workshops.
- Vision 2025 was completed and published in 2004.
- A FFA Matrix was formulated.
- Formulation of FFA document is in progress
- Translated version of Vision 2025 in Marathi will be published soon.

Formulation of Vision & FFA documents

The 'PAWP Vision aims at providing sustainable allocation of available water resources , and also at achieving overall socioeconomic development of the area through stakeholders' particpation.

For this very purpose, following Vision Elements (VEs) were identified by PAWP:

— Water resources development shall aim at optimum utilization with due considerations given to the program for action.

— Water resources management shall be with phase wise development program acceptable to all the stakeholders. Due consideration should be given to monitor progress, proper supervision, proper database, etc.

— Water for food shall aim at increasing productivity of land, crop per drop, etc.

— Water for health shall aim at providing safe water, adequate treatment and disposal and monitoring effluent disposal.

— Water for environment shall aim at assistance to the forest department, maintaining fair weather flow, protecting estuarial eco system, monitoring air quality, river water quality, etc.

— Institutions and governance shall aim at establishing necessary organization and involving NGOs etc.

— Social development shall aim at assisting population control, preventing urbanization, promoting awareness, ensuring women participation, providing affordable health service and providing recreational facility, etc.

— Economic development shall aim at judicious use of water for agriculture, industry, self supporting system, financial arrangement and poverty alleviation.

Industrial growth shall aim at establishing new industries, providing more jobs, sustaining the industries, encouraging clean technologies and providing all emergency plans. Technological development shall aim at providing for proper water supply, waste disposal, industrial processing, energy generation, agriculture, transport, information technology, education etc.

During the preparation of the Vision documents, a number of steps were identified and subsequently applied. These steps are summarized as follows:

- Identification and initial contact with all stakeholders
- Assessment of attitudes of stakeholders to the concept, formation of a Steering Committee
- Collection of available data relating to the catchment to know the present status

- Description of the status of the river system (water quality, hydrogeology and hydrology, land-use, ecology, landscape) and existing uses
- Assessment of the environmental, economic and social implications of the activities of all stakeholders and identification of future uses
- Identification of management action to achieve objectives, including the concerned agencies to assume responsibility for each action and setting up timescales for implementation
- Implementation and monitoring, involving continued regular meetings of the Steering Committee

As mentioned earlier, PAWP has been drafting the Framework for Action (FFA) document since past few months. The objective of FFA is to act as a guideline for the effectively implementing VEs. It is basically an Action Plan to implement the Vision document at grass root level. Thus, it is essential for AWP to have a FFA document, which rather is the very next step after the completion of Vision document. We have approached each of the stakeholders to know about their present and future programmes and their impact on the region and also to apprise them about the potential benefits from a joint planning and management initiative. It also assesses the environmental and socio-economic implications of their. Some field visits to the region have rendered a better understanding of the area and especially the river to us.

As a part of preparing the FFA document, we designed a FFA matrix after considerable amount of deliberations with the stakeholders. It basically focuses on the VEs, each of which is further classified into

sub-elements. The matrix also lists out shortcomings in achieving these VEs in the present context. It also identifies the concerned stakeholders and facilitators who could actively involve in this process.

Current status and follow-up activities

We have tried to cover heads and members of Gram Panchayats/ Group GPs. We have also discussed our work with officials of Zilla Parishad and sought their cooperation and guidance. In month of January, two workshops will be organized for GP members, women organizations and other local stakeholders at Yusuf Meherally Centre, Tara. The objective of these workshops is to obtain a firsthand information from these stakeholders, make them aware about our work and receive their participation and commitment in our work.

Partner institutions and stakeholders

We have identified three categories of stakeholders viz. direct beneficiaries, intermediaries and decision / policy makers. Each of them is requested to detail out its present and future policies and programmes to control river water pollution and to achieve the Vision. The list of stakeholders is enclosed at the end.

Impact of activities of AWP:

PAWP is comparatively younger. Initially, even identifying relevant stakeholders was a difficult issue. We have been mobilizing all concerned stakeholders and have sought their support and cooperation in our effort. They have started addressing their problems. We still need some time for the impact of our work to be felt and assessed.

Future Program of PAWP

- Registering PAWP
- Completion and publishing of FFA

- To empower the Steering Committee , so that it can take charge of day-to-day administration of PAWP.
- To seek attention of government authorities and other concerned institutions towards PAWP
- To represent PAWP at all relevant forums

Constraints experienced

- We have a variety of stakeholders, whose nature is hetrogenous. After our initial efforts, we realized that we need to focus more on the lowest strata, ie, direct stakeholders, who are very much upon the river for their livelihoods
- It is a tremendous task to reach upto these stakeholders and get their feedback and cooperation
- The local population has been suffering for a long time. Since 1989, villagers have stopped using river water. They have approached several authorities. But so far, nothing has happened and the problem still continues to exist. Thus, securing their faith that PAWP can change the picture is a challenge for us.

Water Governance related to your AWP

- There is no sewage-treatment plant for Khopoli town. Khopoli Municipal Corporation should take some steps towards solving this problem.
- Majority of industries dump their untreated effluents directly the river, thereby, degrading the quality of water. MIDC and MPCB, both need to consider seriousness of this situation and take strict measures to prevent such circumstances.
- Villages located remotely face acute water shortage during summer and are either tanker-dependent or fetch water from distantly located sources.

- Poor river water quality has affected the local economy. Villagers dependent on agriculture, fishing for their livelihoods have been severely affected.
- The basin receives a good amount of rain every year. However, there is no proper planning and arrangement to collect, utilize the local and rainwater resources.

List of Stakeholders

1 Irrigation Department (GoM)
2 Tata Power
3 MIDC
4 Khopoli Municipal Corporation
5 Raigad Zilla Parishad
6 Khopoli Industries' Association
7 Ground Water Authority
8 Revenue Department (GoM)
9 Maharashtra Jeevan Pradhikaran
10 Forest Department, GoM, GoI
11 CIDCO
12 Navi Mumbai Municipal Corporation
13 Maharashtra Pollution Control Board
14 Patalganga Rasayani Industries' Association
15 Local bodies such as Office of Tahsildar, Municipal Councils, Gram Panchayats
16 Yusuf Meheralli Centre
17 Rural Community Research Centre
18 MMRDA
19 Konkan Development Corporation
20 Host Institute: Mumbai Centre, Indian Water Works Association
21

What is an AWP ?

The main task of Area Water Partnerships is to identify the interdependence of various water-related institutions and stakeholders and to support them in the sustainable management of their water resources.

While a country Water Partnership (CWP) identifies a country's critical water stressed areas, an AWP focuses more narrowly on a specific river basin where water stress is already a problem or is anticipated within the next 25 years. Within a river basin, there are many water users who affect water quality and quantity.

AWPs, therefore, need to encourage competing stakeholders to reconcile and adjust their demands in the interests of sustainable water management.

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प्रबन्ध निर्देशक

A. M. ALAM
MANAGING DIRECTOR

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MESSAGE

All of us, in one way or the other, are increasingly associated with addressing issues relating to improving water resource management involving stakeholders participation in planning and designing sustainable use of natural resource. Area Water partnership support all such initiatives aimed at IWRM. This would called for setting of greater number of area water partnership.

I am happy to know that the Purna Area Water Partnership is organizing a National level seminar at Nashik, Maharashtra, between 23 and 24 December, 2005, with the overall objective of encouraging NGOs in the launch of area water partnership in various parts of the country.

The Purna Area Water Partnership, one of the longest surviving AWPs, has been instrumental in initiating a number of innovative and people - centric programmes and activities in the Purna Valley, and in galvanizing the support and assistance of the Government and other agencies in its programmes. It is, therefore, more appropriate and befitting that the PAWD has taken the task of organizing a National level seminar for involving the NGOs in the formation and operationalisation of the AWPs.

The seminar would provide not only the opportunities of learning from its wide and varied experience but also would through more light and how base the situation existing in other part of the country could be similarly tackled. The technical proceedings containing the lessons learnt and framework for the future are useful document, which all IWP partners and other agencies would like to refer to in moving forward.

The various themes that have been chosen by the organizers debate and deliberations are important and relevant to the country context. I am sure the deliberations at the seminar, supported by GWP/IWP would pave the way for a better governance and the meaningful management of natural resources.

I wish the seminar all success.

General Secretary
India Water Partnership
alam@IWPindia.com

Mumbai
5 December, 2005

MESSAGE

It gives me great pleasure to note that Purna Area Water Partnership is arranging a National Workshop on Area Water Partnerships in Dec. 2005 at Nashik. Formation of more partnerships will be very useful in resolving the water issues in the sub basins of Maharashtra State. Few Area Water Partnerships are working with participatory approach is an encouraging action at ground level.

Government of Maharashtra has recently declared it's State Water Policy & enacted Farmers' Participatory Act for handing over irrigation systems to the users through Water Users' Association. I think this is the milestone in implementation of Integrated Water Resources Management (IWRM) principle at ground level.

I wish all success to this workshop.

(V.S.Pendse)
Principal Secretary,
Water Resources Department.
Government of Maharashtra
Mantralaya, Mumbai- 400032

INDEX

Acknowledgement

To organize First South Asia workshop on Area Water Partnerships in Sept.2002 in India was a great success to the Purna AWP. It would not have been successful without inspiration and support from Dr. M.A.Chitale, Hon. Senior Advisor, GWP- SAS and Mr. M.S. Reddy.

India water partnership extends the same support to Purna AWP to organize First National Workshop on Area Water Partnerships at Nashik on 23-24,Dec. 2005.

Purna AWP is working since 1995 with Participatory approach to provide multistakeholder common platform to implement IWRM principle at ground level.

We sincerely acknowledge the inspirations, support and constant guidance of Dr. M.A.Chitale, Hon. Senior Advisor, GWP-SAS during preparatory work of this workshop.

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We are thankful to all writers of the theme papers, articles to send it in time to print this proceeding book.

We are thankful to all those who had supported us to success this workshop.

We welcome you all in this workshop and wishes you a very happy new year 2006.

Ashok R. Jadhav
General Secretary,
Convener, National Workshop on AWPs

INDEX