



Environment

Water & Environmental Sanitation Network  
(WES-Net India)



## Solution Exchange for WES-Net India Consolidated Reply

**Query: Urban water supply from water impounding and aquifer recharging/ from Aarohi Trust, Madhya Pradesh/ Comparative Experience**

Compiled, with additional research provided, by Preeti Soni  
19 July 2005

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**Original Query: [Rahul Banerjee, Aarohi Trust, Indore, Madhya Pradesh](#)  
Posted: 24<sup>th</sup> June 2005**

I would like to talk about the water supply for Indore city in Madhya Pradesh. At present, the water is mostly being pumped over the Vindhya hill ranges from the Narmada river. There are two massive pumps and sixty kms of pipes. Since this is not enough there is a clamour for yet another pump and some more pipes. However the normal precipitation in and around Indore, i.e. in the catchments, is many times more than the requirements but is at present mostly running off.

In my view, a more cost effective and environmentally sound solution would be to impound this precipitation in surface reservoirs through water retaining structures and in underground aquifers through recharge. The technology is available and is relatively simple, but there are no takers. Now the Asian Development Bank is initiating a project for pumping up some more water with the inevitable privatisation of the water supply scheme. Whether it is water supply or wastewater management, the planners think in terms of big centralised schemes costing the earth and also being environmentally unsustainable. Our office in Indore recharges all its wastewater into the ground after treatment and it cost us just twenty thousand rupees to install this. People will buy cars for lakhs of rupees but will not install water cleansing and recharging systems.

My question to this Community is, who knows of any examples of cities in a similar situation that have made a successful case for water impounding/aquifer recharging systems? Can you also give an idea about water shortage and augmentation through extra water impounding or aquifer recharging in such cases. Or if anyone tried without success, what lessons can be learned from your experience? Any contacts, readings or case studies would be greatly appreciated.

Rahul Banerjee  
Aarohi Trust  
Indore, Madhya Pradesh

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**[Solution Exchange received responses from:](#)**

1. [Jasveen Jairath](#), Capnet SA Regional Secretariat, Hyderabad
2. [Alok Srivastav](#), UNDP, New Delhi
3. [Rahul Banerjee](#), Aarohi Trust, Indore

*Further contributions are welcome*

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### Summary of responses

Although this query is a good one we did not get as many responses as we had hoped. This could either be due to the limited experience of the Community members, or the possibility that there are not many cases of water impounding and aquifer recharging on a large scale in the cities in India. Some relevant experiences, below, were identified through desk research. We are continuing to explore additional experience globally, and will issue a revised Consolidated Reply with the additional information.

**Uttar Pradesh (from [IWMI](#)):** A large-scale pilot project has been undertaken by the State Government to artificially recharge excess river water that involved channeling monsoon river flows through earthen canals. Evaluations of the project carried out indicate significant rise in the water table, and a positive economic impact of recharge from field and canal water by improving crop productivity. The evaluations provide empirical evidence and estimates of these benefits. The level of the groundwater has risen almost uniformly in the region covered, with the exception of a few small pockets.

**Tamil Nadu (from [Rainwaterharvesting.com](#)):** Water augmentation systems are being used in the state. In particular, recharge trenching, percolation pits and rainwater harvesting is being used in **Chennai** at various locations.

**Madhya Pradesh (from [CGWB](#)):** Several recharge and conservation projects have/are being undertaken in different hydro-geological terrains of Madhya Pradesh. These include for example, construction of subsurface dyke and related structures at **Walmi Farm, Bhopal**. Construction of subsurface dyke contour trenches and sand bag type nala bund has helped in water conservation groundwater recharge by reducing average rate of water depletion and the water retention in the nala bund, as well as increase in soil moisture around the water harvesting tank in the Walmi Farm. Other examples include construction of recharge shafts in **Dewas District** (14 shafts in five districts), and various rooftop rainwater harvesting schemes in different parts of the state.

There are studies and initiatives being undertaken by the [Central Ground Water Board, Bhopal](#), on water impounding and recharge in India. Several pilot and demonstration projects for construction of impounding artificial recharge structures are in place, which have helped in creating awareness and building capacity. However, their work is mostly restricted to micro level initiatives, and there seems to be no attempt as yet to build a macro level water supply and drainage system for a city based on the principles of recharge rather than on withdrawal from a river source.

**Indore city (from [CGWB](#) and original query):** Indore is located on the basaltic lava flows of the Deccan Trap with weathered, vesicular or fractured and jointed basalt form aquifers in the area. The important options are usually identified as rooftop water harvesting, along with some aquifer recharging practices and groundwater recharge methods such as open wells, soak pit, recharge shaft/trench, lateral recharge shaft, and injection wells. As mentioned in the query posed by Mr. Banerjee in his query, small-scale initiatives are being undertaken by the **Aarohi Trust** office for recharging wastewater into the ground after treatment, a system installed at a cost of only twenty thousand rupees.

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## Related Resources

### Recommended Documentation

- IWMI 2002. **Innovations in Groundwater Recharge**. Water Policy briefing. [http://www.lk.iwmi.org/iwmi-tata\\_html/pdf/WaterPolicyBriefingJan2002.pdf](http://www.lk.iwmi.org/iwmi-tata_html/pdf/WaterPolicyBriefingJan2002.pdf) 1.0 MB  
*The briefing highlights the results of a 10-year study in Uttar Pradesh that show that surplus monsoon water can be used to recharge underground aquifers and simultaneously provide farmers with better crop security.*
- IWMI and Future Harvest 2003. **Groundwater Governance in Asia: the Challenge of taming a Colossal Anarchy** World Water Forum III. Water, Food and Environment. [http://www.lk.iwmi.org/iwmi-tata\\_html/WWFIII.htm](http://www.lk.iwmi.org/iwmi-tata_html/WWFIII.htm) 6,3 Kb  
*Contains a series of papers on groundwater related issues in Asia.*
- Ministry of Water Resources 2005. **Model Bill to regulate and control to regulate and control the development and management of ground water**. [http://wrmin.nic.in/cgwb\\_modelbill.pdf](http://wrmin.nic.in/cgwb_modelbill.pdf)  
*The bill aims to regulate and control the development and management of groundwater and related matters including recharge.*
- Pereira, L S, I Cordery, I Iacovides 2002. **Coping with water scarcity**. Technical Documents in Hydrology. UNESCO. <http://unesdoc.unesco.org/images/0012/001278/127846e.pdf>. 2.2 MB  
*The publication provides a good overview of water related issues including a comprehensive chapter on groundwater use and recharge.*
- Sakthivadivel, R and A S Chawla 2002. **Artificial recharging of river water: An experiment in Madhya Ganga Canal Project, India**. IWMI and University of Roorke [http://www.iwmi.org/iwmi-tata/files/zip/PM02/06\\_Sakthi.zip](http://www.iwmi.org/iwmi-tata/files/zip/PM02/06_Sakthi.zip) Winzip 930 KB  
*This paper examines the artificial recharge pilot project in Uttar Pradesh*
- Ballukraya, P N and R. Sakthivadivel. 2002. **Over-exploitation and Artificial Recharging of Hard-Rock Aquifers of South India: Issues and Options**. Paper presented at the International Water Management Institute Annual Partner's Meet 2002. [http://www.iwmi.org/iwmi-tata/files/zip/PM02/11\\_Ballukraya.zip](http://www.iwmi.org/iwmi-tata/files/zip/PM02/11_Ballukraya.zip) WinZip 1,723 Kb  
*Based on the case study (Rasipuram taluka, Namakkal district, Tamil Nadu) results, the paper draws broad conclusions and some suggestions for managing the over-exploited aquifers.*

### Recommended Organizations

- Central Ground Water Board, North Central Region, Bhopal**. <http://cgwbmp.nic.in/>  
*The responsibilities of the Regional Headquarters of Central Ground Water Board include carrying out groundwater surveys, artificial recharge studies, geophysical surveys, management and development of groundwater resources, etc.*
- Narmada Control Authority**. [http://www.ncaindia.org/nb\\_water.htm](http://www.ncaindia.org/nb_water.htm)  
*The Authority has been setup under the final orders and decision of the Narmada Water Disputes Tribunal (NWDT) as machinery for implementation of its directions and decisions.*

## Recommended Websites

**Ground Water Conservation and Recharge. Central Ground Water Board, North central region, Bhopal.** <http://cgwbmp.nic.in/gwrecharge.htm>

*The site lists major initiatives with lessons in different parts of Madhya Pradesh and the plan for artificial recharge.*

**Rainwaterharvesting.com.** <http://www.rainwaterharvesting.org>

*The site hosted by Center for Science and Environment provides information about rainwater harvesting techniques and some case studies from India.*

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## Solution Exchange Responses in Full

**[Jasveen Jairath](#), Capnet SA Regional Secretariat, Hyderabad**

I have my doubts if such an experiment has been undertaken at the level of a city - obsessed as the decision makers are by "heavy" technical options. However, I was very struck with your organizations working experiment of treating and recycling water and only for Rs. 20,000! I would greatly appreciate if you could send us the details about your building, what are its water demands and who is the technical agency, who has installed/maintained the system and some elementary details about the technical system.

We will be engaged with a diagnostic study two Indian cities and preparation of action plans towards the end of this year. We are also engaged with studying the use of UNTREATED wastewater for peri-urban agriculture in Hyderabad and its dangerous consequences. In this context - your experience of localized treatment/recycling of water etc is of tremendous interest to us.

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**[Alok Srivastava](#), UNDP, New Delhi**

I would like to present some points for your consideration and also if you could try to answer them. That might throw a little more light on the issue:

1. The first augmentation of water supply from the Narmada river in Indore was done some years back. One would like to think that the option of water impounding and aquifer recharging must have been looked at closely then, and the option of bringing water from Narmada was preferred. Do you have access to any information from the Public Health Engineering Department on this, or can you get any information which might throw more light on the issue.
  2. Usually the tanks/reservoirs that form the mainstay of water supply in most Indian cities/towns are old and the possibility of increasing the storage capacity is quite marginal. What is the status of the main reservoir in Indore? Can any member please give any information about similar/comparative situation elsewhere.
  3. Is there a way of calculating aquifer recharging over a period of time?
  4. Is any action being taken in Chennai for augmentation through water impounding and aquifer recharging?
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**[Rahul Banerjee](#), Aarohi Trust, Indore**

I doubt whether there has been any attempt anywhere to build a water supply and drainage system for a city based on the principles of recharge rather than on those of withdrawal from disposal into some river source. Since there is no funding for research on these lines so there is little possibility of any research being done on this also? Even the work done by the Centre for Science and Environment is mostly restricted to individual house systems. There has not been any macro planning at the city level.

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*Additional contributions are welcome. We invite you to send in your responses to Solution Exchange for the Water and Environmental Sanitation Network in India at [se-wes@groups.solutionexchange-un.net.in](mailto:se-wes@groups.solutionexchange-un.net.in) with the subject reading 'Re: [se-wes] Query: Urban water supply from water impounding and aquifer recharging/ from Aarohi Trust, Madhya Pradesh/ Comparative Experiences'*

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