THE ROLE OF RAIN CENTRES IN POPULARIZING AND PROMOTING RAINWATER HARVESTING IN URBAN AREAS.

By

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I. INTRODUCTION

Rain is the predominant source of all the fresh water on this planet. Harvesting rain is thus one crucial means of sustaining both our surface and sub-soil water sources. That this has been historically well understood throughout rural India is evident from numerous traditional water harvesting systems put in place long years ago and still in operation. On the other hand, urban India to date has not only taken water for granted but has exhibited little interest in rainwater harvesting (RWH), despite its potential to help sustain groundwater sources in the urban milieu either indirectly, by using harvested rainwater to lessen the need for pumping groundwater, or directly, by injecting the harvested water into the aquifer.

60% of India is expected to be living in towns and cities by 2025. Municipal authorities are finding it more and more difficult to meet the water needs of this bourgeoning urban population. A classic example is the coastal city of Chennai (Madras), one of the four major metropolises of India and the capital of the state of Tamil Nadu. Inadequate supply of municipal water over the last two decades has forced the populace to relentlessly tap groundwater for its needs. This over-exploitation has resulted in the sharp depletion of the groundwater table and to deterioration of its quality as well. In Chennai's coastal suburbs in particular, seawater has already intruded into the coastal aquifers, rendering groundwater quite saline.

Many other cities, both in India and elsewhere, are already facing a similar situation or heading towards it. India, with its bounteous monsoon rains, can substantially alleviate the problem by artificial recharge of the groundwater in areas like Chennai, where the underlying sandy soil and aquifer structure is suitable for such purposes. That is, after rainwater has been gathered by efficient and cost-effective RWH structures throughout the city, it can be systematically injected into the soil by means of equally cost-effective wells and other infiltration structures. Urban rainwater harvesting is of a more recent origin than rural water harvesting, and new designs will have to be developed for the urban context, particularly for RWH systems that are primarily concerned with aquifer recharge. But progress made to date in Chennai indicates that such changes are indeed feasible, cost-effective, and potentially quite effective in other similar urban locations.

Almost all major cities in India suffer from the dual problems of flooding during monsoon months and water scarcity during non-monsoon months. This is probably true of several other cities around the world. While shrinking of open spaces and indiscriminate paving activity indulged in by both the society and state has been responsible for flooding of cities, over exploitation of groundwater sources, not making any sincere attempts by the residents and the government to harvest rainwater and the apathetic attitude of urban residents towards water in general and RWH in particular are some of the reasons for water scarcity.

II. RAINWATER HARVESTING ACTIVITIES IN CHENNAI – ROLE OF INDIVIDUALS AND THE RAIN CENTRE.

Realising the fact that the problems faced by urban residents is essentially due to lack of awareness regarding the importance of water, its sources particularly groundwater, the need to sustain it through RWH, the author, in order to create such an awareness among the residents of two of Chennai's coastal suburbs, Besant Nagar and Valmiki Nagar, has been involved, as an individual, in a door to door campaign since 1995. Both the quality and the exploitable quantity of groundwater in these localities were excellent till about ten years back. But, as construction proliferated, use of groundwater increased steadily even as the amount of bare soil available for direct absorption of rainwater shrank substantially. As a result, the groundwater table level in these areas steadily went down.

During the campaign, it was explained to the residents that implementing rainwater harvesting in these sandy-soiled areas would be very simple and cost-effective as well as being an excellent tool for preventing seawater intrusion into the aquifer. This is especially germane in cities like Chennai, where many people live in multi-story apartment complexes that depend on individual wells, rather than a municipal water system, for both potable and non-potable water uses. However, the concepts being new, the initial response to these ideas was none too encouraging; residents were reluctant to invest in rainwater harvesting systems. It took almost three full years and the help of the

print media -- especially neighborhood newspapers -- to convince the residents of the need and relevance of RWH in a city like Chennai.

In order to accelerate these activities, a few like-minded people formed the Akash Ganga Trust in January 2001. "Akash" means the sky and "Ganga" denotes the perennial river Ganges of North India, believed to have descended from the sky - thus the name means "water received from the sky," or rainwater. On August 21, 2002, the Trust launched Chennai's Rain Centre, inaugurated by the Honorable Chief Minister of Tamil Nadu. The Rain Centre, the first of its kind in the country, is a one-stop information and assistance center on rainwater harvesting. The initial seed money for the center came from a few non-resident Indians living in the U.S. Further support, in the form of resource material, was provided by Centre for Science and Environment, an NGO head-quartered in New Delhi. The state government of Tamil Nadu is also one of the co-sponsors of the Rain Centre.

In addition to Akash Ganga Trust, a few other NGOs like Rotary Clubs, Lions Clubs and INTACH (Indian National Trust for Art and Cultural Heritage) have also been playing an active role in promoting RWH in Chennai. Particular mention must be made of the efforts of Rotary International District 3230 in renovating and reviving seven temple tanks for use in artificial recharge of the harvested rainwater, besides creating awareness among its members.

The Rain Centre, which is open to all, charges no fee for its services to the citizens. Its activities, carried out thanks to the funds received by the Akash Ganga Trust through donations, are summarized below. The Centre has been involved in all the three thrust areas, required to promote urban RWH and defined below, since its launch three years ago.

1. **Education:** Creating awareness regarding the importance of rainwater harvesting, both for immediate uses and also for sustaining the water table in the long run.
2. **Implementation:** Designing and providing programs to help citizens implement rainwater harvesting in an efficient and cost-effective manner.

3. **Evaluation/Research:** Carrying out studies on i) the nature of the sub-soil in different city neighborhoods and its capacity to absorb large quantities of injected rainwater; ii) the effectiveness and adequacy of various types of RWH structures; and iii) the post-monsoon impacts on the quality and exploitable quantity of groundwater in places where RWH has been implemented.

II.1.1 EDUCATION

1. A number of large sized colorful poster panels highlighting the value of water and the importance of RWH are on permanent exhibition in the Rain Centre.
2. Working models in the Centre demonstrate RWH both from flat and sloping roofs and from ground surface runoff.
3. Different types of actual RWH systems have been installed in the Centre's premises, e.g.:
    a. diversion of rooftop rainwater into plastic tanks above ground, for immediate use;
    b. diversion of rainwater into below-ground masonry cisterns equipped with sand filters to enable immediate use of the water, and with overflow directed to traditional dug wells for use and recharge purposes;
    c. trapping of surface runoff on individual properties through means of shallow trenches dug and directed in such a way as to direct the trapped water into a recharge well.

    These RWH systems can be demonstrated "live" by simulating rainfall to enable visitors to understand better how the systems operate and how simple the methodology is.
4. Video film shows on RWH are presented periodically for the general public.
5. Resource materials like booklets, posters etc. have been prepared in English and Tamil and are distributed at a nominal cost. The posters have also been pasted in public places, where people tend to assemble like the Divisional and Zonal offices of the Municipal Corporation and Chennai Metrowater, Post offices, Marriage halls, Bank branches, and School and College notice boards.

6. A publicity button was prepared and worn by Trust members in order to publicise RWH. A sign saying “RAINWATER HARVESTING DONE IN THIS PLOT” distributed to people who had implemented harvesting in their respective premises, also generates publicity when it is fixed on the gates so as to attract the curiosity of passersby.
7. During the last couple of years, students from several schools and colleges have visited the rain centre and learnt about RWH. Key persons from the centre have also visited several institutions both within and outside the city and the state, to give talks, make video presentations and organise exhibitions about RWH.
8. Several NGOs, working in both water sector and other areas have visited the rain centre.
9. Seminars and workshops have also been organized in the centre.

II.1.2 Implementation

1. Free, site-specific advice is provided to all those who want to implement RWH systems in their respective premises, including academic institutions, offices, industries etc.
2. The Centre conducted two training workshops in RWH for a group of plumbers, who were thereafter sent to different areas to advise residents on RWH design and implementation costs. The Centre received several hundred calls during 2002 - 2003, requesting such help.
3. With the help of these trained plumbers, RWH was directly implemented in more than 1000 premises; an equal number of residents were provided with advice on getting it done with their own plumbers. Though this may appear to be a small fraction in the total number of households in Chennai, it has had an important "ripple effect" in spreading the correct methodology.

II.1.3 Surveys and Effectiveness Studies

The Centre surveyed a local residential colony to ascertain the adequacy of the RWH structures that had been installed to comply with the law, described in more detail below,

enacted by the Tamil Nadu government making RWH compulsory. The survey revealed that only 30% of the residents had done well and another 20% satisfactorily. The remaining 50% had done it without any involvement and realization of the benefits of RWH.

Another survey examined how citizens are managing their water needs for both potable and non-potable uses. The findings were published in the local English newspapers. Due to failure of the northeast monsoon in Chennai during 2003, assessment of the post-monsoon and post-harvesting effects on quality and quantity of groundwater, for establishing the benefits of rainwater harvesting, was deliberately left out of the scope of the survey.

II.1.4 Future Activities

Having created widespread awareness about the importance of RWH both in Chennai and throughout Tamil Nadu, the Rain Centre proposes to follow up by educating residents about potential problems that may result from RWH structures put up without the help of trained resource persons. Residents will also be helped in correcting and repairing any structures determined to be faulty. In addition, the Centre will continue to work with larger organizations towards effective implementation of RWH in their respective premises. Workshops for training plumbers will also be conducted regularly in future.

As another water conservation measure, the Rain Centre also proposes to promote awareness about the importance of water reuse. Water that is used for bathing, washing clothes, vessels, vegetables etc., is generally referred to as "sullage." Currently, this sullage, typically 50 – 60 liters per day per person, gets mixed with sewage (water from toilets) and sent to sewage treatment plants for treatment. However, this sullage does not need the degree of treatment that sewage does; it could be easily and economically purified of organic compounds and either directly reused or indirectly reused by recharging it into the groundwater.

In addition, the Rain Centre is offering its help and expertise to set up similar centres in other cities in India and is also conducting a survey to select cities in other countries where RWH for large-scale groundwater recharge would be relevant.

The Trust is also interested in setting up, at its own cost, RWH systems in charitable organizations such as old age homes, orphanages, homes for the physically and developmentally disabled, and homes for destitute women. Since these are basically service organisations depending on donations from concerned individuals and corporations, they are often unable to afford the financial outlays needed for the installation of RWH systems. At the same time, these organisations require large quantities of fresh water both for potable and non-potable uses; therefore it is very important for them to sustain local groundwater sources through the practice of RWH.

II.2 ROLE OF THE GOVERNMENT

Following the example set by our rain centre and realizing the need for a few more such centres in a big city like Chennai, the government started two more rain centres in two different localities in Chennai as well as in the offices of the collectors of twentyseven other districts. Through these rain centres several awareness raising activities were carried out. A Publicity Van was specially made to propagate RWH in different localities, besides producing and distributing resource material on RWH in English and the local language. School and college students have been involved in RWH awareness raising campaigns in the entire state through the National Service Scheme (NSS), a government supported activity in colleges and polytechnics. They have also been involved in rallies carrying placards about the importance of RWH.

As part of the implementation activity, the Tamil Nadu government enacted a law in October 2002, followed with an ordinance in June 2003, making the implementation of RWH systems compulsory in all existing buildings in the entire state of Tamil Nadu on or before October 11, 2003. To show that it not only preaches but also practices, the government also issued orders to all its departments to implement RWH in buildings belonging to them. In addition, the Chennai's Metrowater Department has conducted free

workshops on RWH implementation techniques for all interested, and especially for unemployed diploma holders, who are subsequently listed as resource persons for carrying out RWH in houses/flats. To date, however, the government has not carried out any surveys, such as those conducted by the Akash Ganga Trust Rain Centre, to ascertain the efficiency of the RWH systems implemented by Chennai residents.

III. CONCLUSIONS

Chennai city, like most of the other large metropolitan areas in India, is water starved but not rain starved. All we have to do is to make sincere attempts to harvest every drop of water that falls on our heads before thinking in terms of mega projects like interlinking of rivers, desalination of sea water etc. It would not be wise to discharge into the sea a quantity of rainwater equivalent to one year’s needs monsoon after monsoon, while at the same time talking of desalination. Furthermore, we cannot overemphasize the danger that excessive pumping of groundwater from coastal aquifers will result in seawater intrusion into those aquifers, creating permanent and irreversible damage to the water supply. Thus rainwater harvesting, while important in every major town and city the world over, is particularly important in coastal cities. For example, given India's long coastline, implementation of RWH in the country's coastal cities has great potential and should be taken up on a "war footing."

The need of the hour is to spread the message of RWH from neighborhoods to cities and to countries. This, I am convinced, can best be achieved by carrying out awareness raising campaigns and by setting up more Rain Centres across the length and breadth of every country as a mass movement. Cities throughout the world, which are water starved but not rain starved, will have to be identified and selected for this purpose. I would like to conclude by emphasizing again that water harvested is water produced. Our slogan for the future should be: HARVEST RAINWATER LEST WE PERISH.