CHAPTER VII

RAIN WATER HARVESTING – ITS ROLE IN PROVIDING SAFE DRINKING WATER

Introduction

Water is the basic need of all living organisms. It is the right of every person to have access to safe drinking water. The right to safe drinking water is a part of right to life and therefore surely a natural right. Yet, thousands of villages have no source of safe drinking water. The total water resources of India are approximately four percent of the world’s fresh water resources whereas the country’s population is more than 16 percent of the global population. Yet with rising populations and demands for water from all sectors there is scarcity and competition of water even in countries where the water is seem to be abundant. Now, the competition for water can lead to violent conflicts between people’s lives and livelihoods. Achieving positive outcomes from competition requires explicit attention to water rights and in many cases, redefining the nature of right and right holders. So to overcome these difficulties many regions of the world have now started encouraging the concept of ‘rain water harvesting’.

The present water resources is critical, especially the ground water exploration and availability is causing a lot of concern. The rural areas are most vulnerable to changes in water resource availability and are least capable in adapting their livelihood to the changes. The water has close linkage with the food security and quality of life of the people. Water management and construction, well organized water pricing system in 400 BC, construction of dams, tanks etc., mentioned in ancient books reveal the significance of water and its management in the hoary past. We should accept that when water
resources are scarce they must be conserved and the availability be augmented by minimizing losses and maximizing retention. For this, water shed management through rehabilitation of existing dams like tanks, construction of check dams and rain water harvesting need to be promoted. Our experience of thousand of years since the dawn of civilization has shown that minimum water requirements of every household anywhere can be easily met by the traditional methods of collecting rain water locally in village/community ponds and large man made containers, diverting and storing water from local streams/springs and tapping sub surface water below/stream beds.

**Rain Water Harvesting – Concept and Definition**

The term ‘rain water harvesting’ refers to direct collection of precipitation falling on the roof or on to the ground without passing through the stage of surface run off or land. It is a technique of collection and storage of rain water at surface or in sub surface aquifer, before it is lost as surface runoff. The augmented resource can be harvested at the time of need. The main aim of rain water harvesting is as follows:

Water is a mobile substance which exists as three phases, solid (ice), liquid and vapour. It is always on the move and water harvesting is basically the practice of holding it in place or in the desired phase for some period of time for human utilization. The term water harvesting is also referred to as ‘rain water harvesting’. Water harvesting has been defined as the process of collecting and storing water from an area that has been treated to increase precipitation run off. A ‘water harvesting system’ is described as the complete facility for collecting and storing precipitation run off.

A comprehensive definition of the term was prepared by a working group on ‘Rain water harvesting’ constituted by the Rajiv Gandhi National Drinking Water
Mission of the Government of India. The group chaired by Mohammed Inamul Haq, advisor in the Water and comprising scientists, engineers and representatives, NGOs and Government Officials, had four meetings and prepared a comprehensive definition of the term “rain water harvesting”. As per this, the term ‘rain water harvesting’ refers to collection and storage of natural precipitation and also 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 a physiographic unit such as watershed.6

**Traditions of Rain Water harvesting**

India has an age old tradition of water harvesting or water management. The earliest reference of this practice is in mythology. King Bhageerath is supposed to have arrested the waters of the river Ganga in its upper reaches and diverted it to a different cause by constructing a barrier across it or by selectively breaching the natural barrier created across it because of land slide.7

The recorded evidence of water harvesting is found in Harappan and pre Harappan civilization dating back to 4000 to 6000 B.C. Harappan people were well versed in the construction of storage tanks, well irrigation gravity flow and diversion of river water to farm lands by constructing temporary bunds across streams. Dholavira an excavated port city located on the Khadir Island in the Gulf of Kachchh where the mighty Saraswathi was flowing in Harappan times. The citizens in Dholavira had constructed check dams across these streams to divert the seasonal floodwater in the fort city, from where it was carried all over through an elaborate system of drains.8
The first reference to the hydrological cycle in the world comes from the Chandogya, one of the principle Upanishads (the philosophical reflection of Vedas) which point out, “The rivers….discharge their water into the sea. They lead from sea to sea; the clouds raise them to the sky as vapour and release them in the form of rain”. This reference shows that as early as 1000BC attempts were being made to interpret and explain recurrent natural phenomena on the basis of direct experience.

The nature of India ecology force Indian to develop the art of water harvesting. Though the nation gets a high amount of rainfall as much as 1,100mm per year this rainfall is not evenly spread across the river. Most of the time, when blessed with normal rainfall the country faces drought. Not surprisingly, any water gifted by the heavens or flowing past in a stream has been harvested in India since antiquity.9

The traditional water harvesting structures is known in different names in different parts of India. They are called ‘kuhals’ in Jammu, ‘keils’ in Himachal Pradesh, and ‘guls’ in Uttrakhand. The Maharashtrians call them as ‘pats’. In Ladakh, they are called ‘zings’ and in Nagaland as ‘xabo’. Tamilians call them ‘eris’ and the Kannadigas by the name ‘keras’. Traditional water harvesting system exists all over India but after serving the nation for several millennia they are dying a slow death.

In the very dry areas, the primary need of the people was drinking water and various ingenious techniques were developed to collect rainwater to use as drinking water.10

Indian villages functioned like little republics and played an important role in managing their own reosurces. As a result people took in their hands the role of water harvesting in the form of community management. They always had a very important
role in constructing and managing water harvesting systems. But there was neglect to these systems and disdain for anything managed by the people, which meant that no effort was made to revive these systems or build new systems in a way that complemented the traditional system. The panchayat as an organ of governance is traditional to India as some of its water harvesting system. These systems despite their recognition in national plans have declined their effectiveness.

India today has thousands of villages with acute drinking water shortage. Former Prime Minister, Late Shri Rajiv Gandhi had launched a special programme to meet the drinking water needs of all villages and even today more and more towns and cities are finding it difficult to provide urban households with a 24 hour water supply. Yet, it is amazing that people today remember these systems only when there is an acute drought or water emergency.

**Importance of Rain water harvesting in the present era**

In recent years water scarcity, especially in urban areas, has brought home the necessity of evolving a long term strategy to solve the problem. The nation has more than 250 million city dwellers. It is predicated that by 2021 nearly 553 million of India’s population will be living in the cities.11

After India’s independence water resources of the country, which were till then managed at the community level and individual level came under the pervasive control of the state. Local communities and house holds were no longer the primary water managers. This resulted in the decline of rain and flood water to be managed for the daily needs and there is an ever increasing reliance on surface and ground water.
India is a country blessed with showers, the average annual rainfall being something about 1,170 mm\textsuperscript{12}. Rain water harvesting is a technique to improve the management of water resources and it refers to the activity of direct collection of rainwater, which is then either stored for direct use or used for recharging the ground water table.\textsuperscript{13}

The UN Report published ahead of the World Water Forum in Kyota, Japan from March 16-23, 2003 says world water reserves are drying up fast and booming population, pollution and global warming will combine to cut the average persons water supply by a third in the next 20 years. India was ranked 120 among 122 countries on the quality of their water provision. Optimal sustainable development, maintenance of quality and efficient use of country’s water resources to match the growing demands on this precious natural resource with active involvement of all in order to achieve the accelerated, equitable economic development of the country is the need of the hour.

A study conducted by the World Bank indicate that the per capita availability of water in India, which was in the order of 5000 cubic.m.per year at present. The frequent failure of monsoons in some region or other, resulting in drought conditions causing acute drinking water scarcity especially in 1174 blocks in Desert Development Programme (DDP) districts.\textsuperscript{14}

India’s water consumption is approximately 20.1\% of the world consumption with a per capita consumption of 297.7 cubic m. Against this backdrop it become necessary to examine various options for meeting basic requirements of safe drinking water to the community. In this regard the only option that is technically
feasible, socially desirable and economically viable is rain water harvesting which is simple, cost effective and easily adaptable by all.

It is well known that rain water is biologically pure, soft in nature and free from organic matter. Rain water harvesting has today proves itself to be an effective technique for conserving water by guiding the rainwater that falls on the roof tops to storage tanks or underground tanks for the future usage. The principle of collecting and storing precipitation from a catchment surface is known as rainwater harvesting. Water harvesting also included activities aimed at harvesting surface and ground water, prevention of losses through seepage and evaporation and other techniques aimed at conservation and efficient utilization of limited water endowment. In general water harvesting is the activity of direct collection of rain water.

Rain water is the primary source of fresh water. Water harvesting is aimed at understanding the value of rain and to make optimum use of rain water at the place where it falls. We have lot of rain yet we do not have water. Before embarking on this, an important question needs to be addressed. Who owns the water that falls on the land or in other words does the state have any sovereign rights over the rainwater? This is question of vital importance for rain water harvesting cannot be implemented and promoted unless and until some sort of ownership is vested on those who domestically collected the rainwater.¹⁵

Domestic rain water harvesting necessarily involves vesting of ownership on the water collected domestically through the construction of rainwater harvesting structures. Thus, a shift towards governmental acceptance of domestic rain water
harvesting must automatically mean that the government can no more claim sovereign rights over rain water.\textsuperscript{16}

The most interesting piece of legislation is in the Tamil Nadu Municipal Laws (Second Amendment) Ordinance, 2003\textsuperscript{17} which makes rainwater harvesting mandatory for existing private as well as public buildings. As per the Ordinance, a new clause (A) to the S.255 of the Chennai Municipal Corporation Act was added.\textsuperscript{18} Same amendment was made under S.215 of the Tamil Nadu District Municipalities Act, 1920; S.295 of the Madurai City Municipal Corporation Act, 1971; and S.295 of the Coimbatore City Municipal Corporation Act, 1981. In case of default the Commissioner or any other person authorized by him was empowered by the Ordinance after giving notice to the owner or occupier to build the rain water harvesting structure in the building. The cost is then incurred from the owner along with the incidental expenses. Moreover the Act also provided that the water supply connected to such building were to be disconnected until the rain water harvesting structure is put up.\textsuperscript{19} But it was found that in spite of the difficulties posed by the short notice most Chennai people welcomed the step of constructing the rainwater harvesting structure.

\textbf{Rain Water Harvesting in Kerala}

The Government of Kerala has taken the initiative to turn the rain water harvesting and water conservation into a mass movement in the state. The movement undertook campaign and measures for rainwater harvesting, protection of the environment and conservation of water bodies. The Government has also taken initiative to organize conventions to create awareness about the importance of water, rain water harvesting and environment among the people. About one lakh Ferro cement tanks
State government would fund the project. Special programmes were planned for rain shadow areas of the state. For this, the committees would be constituted at the district and village level. The village level committee would form groups of 50 families each to carry forward the campaign. Many voluntary agencies have come forward to participate in the program.

Kerala receives annual rainfall of 3,300mm but facing water shortage because of inadequacy in its conservation. Flood during the rainy season followed by the drought results in water scarcity. Most of the water resources in the state are polluted by one way or other. Only 8% of the rain water is used by the state during rainy season. It is an advantage if we can use a part of the rain water. The Kerala Government has inaugurated a program on 2nd October, 2005 to provide the awareness and importance of rain water harvesting. Within a couple of years the government and other non governmental organizations have understood the relevance and significance of rain water harvesting. Now the Government of Kerala made it mandatory that the entire newly constructed house should have the provision of rain water harvesting structures.

Government of Kerala is providing a subsidy of Rs.2lakh for institutions and other establishments for rain water harvesting. A number of governmental establishments and organizations are the beneficiaries of this grant. Many of the private establishments are in the path of rain water harvesting.

As per the Government Order 92/2004 dated 12/1/2004 of the Local Self Government Department, buildings should have either rain water harvesting tanks or rainwater percolation pits. Accordingly Kerala Municipality Rules 1999 have been
amended to incorporate rain water harvesting rules for the new buildings in the municipal areas. As per this roof top rain water harvesting arrangements shall be provided in all new residential buildings (with a floor area of 100 sq.m. or more and plot area of 200 special residential buildings, medical/hospital, educational, assembly office/ business buildings.) The floor area to be considered should be the total floor area of all the floors. Those lesser than the above specification should have recharge pits.

The said rule exists for more than 3 years in the municipality and Municipal Corporations. And it is learnt that no much progress is made in keeping the roof top rain water harvesting mandatory. Rain Center, Trichur, a Community Organization and Development that works for the awareness building on rain water conducted a study to assess the progress made by the state. A survey was held among the building contractors, officers concerned and the Municipal Division Councilors from the Corporation areas. Survey reveals that the implementation of the roof top rain water harvesting structures is merely used though all these building has secured proper building number after the inspection of the state corporation.

In a survey conducted in and around Trivandrum city, there arose a mixed response in constructing rain water harvesting structures. Among 120 families, 80% observed various difficulties in establishing rain water harvesting structures as the land available in the urban areas is very limited to they hardly have space to construct the rain water harvesting structures. The families having the space to build the tank found too reluctant to do so mainly for the fear that they believe that the rain water is not fit for domestic purposes. On the contrary, the water availed through the municipal corporation is often golden colour; still the people prefer to make use the contaminated water. This
shows that people are still ignorant about the purity of rain water. Quite often public water supply is off due to repair and maintenance works during the rainy days. This does not necessitate the people to make use of the rain water which is pure in nature. Again flats and multi storied buildings have to construct the storing systems in each floor which is not viable due to the limited space available for such buildings. Finally some households find the appearance of rainwater harvesting in residential building as monstrous. This all reduces the construction of rain water harvesting structures in urban areas.

Irrespective of these indifferences and brain storming opinions of the urban people, some knew the importance of rain water harvesting structures and they are keen to conserve the rain water and also to recharge their open dug well by rain water.

Diagram 7.1

Diagram representing the construction of rain water harvesting structures in urban and rural areas
No space to construct structures 65-70% in urban areas and 30-35% in rural areas

Urban areas 25-30%

Rain water harvesting structures

Rural areas 40-45%
Diagram 8.2

Diagram showing the use of drinking water source in urban area in Kerala.

An increased demand and unregulated exploitation are threatening to the accelerated depletion of ground water resources of Kerala, according to a survey conducted by the Central Ground Water Board and State Ground Water Department. The study reveals a heavy imbalance in the availability of ground water resources in the state over the past 5 years resulting in the higher exploitation. Unregulated exploitation of
ground water resources result in the fast depletion of ground water reserve and failure to enhance the recharge facilities is seen in the larger parts of the Trivandrum district. Therefore it is suggested that the rain water harvesting and recharging the aquifer may reduce the depletion in ground water resource.

‘Giridhara’ a program put forwarded by the Kerala Government to preserve the rain water in the Wayanad District among the Adivasis had become a failure due to the lack of interactions from the part of the government\textsuperscript{21a}. From this it is clear that even though government had started many initiatives in the state of Kerala for preserving rain water it has become a failure due to the lack of initiative from the part of the community management.

**Recent Initiatives**

1. Since sustainability of the drinking water sources is of paramount importance for the smooth functioning of rural water supply about 25% out of 20% of the allocation under the Accelerated Rural Water Supply Programme (ARWSP) has been earmarked exclusively for water harvesting schemes to make implementation of such schemes necessary.

2. Besides feasibility studies along with consultancy services for preparation of pilot projects on rainwater harvesting in selected states have to be taken.

3. The traditional water harvesting structures have to be initiated at the community level.

4. The Bhoomijal Samvardhan Puraskar and the National Water Award have been instituted under the Ministry of Water Resources for the year 2007 with an
objective to encourage the NGOs/Grama Panchayats/Urban Local Bodies (for population up to 1 lakh) for adopting innovative practices of Ground water augmentation by rain water harvesting and artificial recharge of ground water through people’s participation in the targeted areas resulting in ensuring the sustainability of ground water resources and development of adequate capacity among the stake holders. Such programmes have to be given wide range of publicity from the community level for the implementation of rain water harvesting structures.

Conclusion

Thus, there is an urgent need for propagating water harvesting, conservation and recharging on a large scale. The water harvesting can be done with an active participation by selected individuals and communities. In this regard, the efforts from the part of the government alone will not be adequate, for this, prominent voluntary and non governmental organization has a major and crucial role to play for keeping a liaison between the state and the community to educate, moderate and to transform the water harvesting into a mass movement. Recycling of water and water conservation will be crucial component of our daily lives in the coming millennium. As far as possible the technologies should be indigenously developed so as to make then socio economically relevant.

Regulatory mechanism by the state governments is necessary to check the blatant and unscientific use of this resource. Excess digging of wells should be avoided or restricted in severally affected areas. Permission of digging of wells should be linked with the construction of water harvesting structures. In urban areas, harvesting of rain
water should be made mandatory so that the water stored could be used for other than drinking purposes.\textsuperscript{23}

Relatively cheap and simple water conservation devices, such as spray taps and simple rain water butts can offer short pay back periods in rainwater harvesting. On June 21, 2001 the Parliament rightly held, “We must do away with the nation that droughts we face from time to time in many parts of the world are caused by the shortage of rainfall. With a programme of harvesting rain water we can avoid drought even in times or places considered to have low rain fall.”\textsuperscript{24} Although rain water harvesting techniques appear to be simple but the full benefit could only be gained by adopting a cooperative approach of implementation by Government, Semi Governmental organizations, and other voluntary organizations. For the preservation of rain water legislative measures should be strictly followed and at the same time the over exploitation of ground water resources should be curtailed. Community participation and people’s participation by giving power to the Panchayats would help to preserve the rain water. This can be achieved by providing the local people with the education and need for the preservation of rain water for the future purposes.
References


5. a. to overcome the inadequacy of surface water to meet our demands.
   b. to arrest decline of ground water levels.
   c. to enhance availability of ground water at specific places and time and use rain water for sustainable development.
   d. to increase infiltration of rain water in the sub rock which has decreased drastically in urban areas due to open area etc.,

6. The definition include within itself:
   1. Construction of permanent storage structures for collection of rain water.
   2. Farm ponds for collection of run off, either for supplemental irrigation or for augmentation of rain water.
   3. Percolation tanks at appropriate sited for augmentation of rain water,
   4. Construction of ponds and reclamation/revitalization of traditional water harvesting structures.
   5. Artificial recharge through wells.

7. *Supra* n.3 at p.39.


9. As per Archaeologist, B.M.Pande, evidence of this tradition can be found in ancient texts, local tradition and archeological remains. There is some evidence of the existence of advanced water harvesting system even from th pre historic times. Hindu texts like Puranas, Mahabharata and Ramayana and various Vedic, Buddhist and Jain works contain several references to canals, tanks, embankments and wells. (*See*, Anil Agarwal, ‘Dying Wisdom’, *Down to Earth*, March 15, 1997).

10. In Rajasthan there is an age old tradition of using the roof top as catchment area to collect rain water. And, in areas where land is not a limiting factor, people even developed customized rain water harvesting structures called ‘kundis’ to obtain the drinking water. ‘Kundis; are artificial wells which store surface runoff from an artificially prepared catchments surrounding the well so that any rain water that falls
on the catchments rapidly run off to the well and get stored. (See, Anil Agarwal and Suneeta Narain, ‘Dying Wisdom’, *State of India’s Environment*, Centre for Science and Environment, 2001, p.28).


12. However, the rainfall pattern is skewed varying from 100mm in the desert regions of the Western portion of the country to about 11,000mm to certain places of the North East (S.2 of the Planning Commission, Tenth Fiver Year Plan, (2002-2007), 271 (2002)).


15. The case of Uttaranchal state bring to force the need to develop a consistent yet flexible legal framework, which would enhance the possibility of meeting the water needs of the people. With the coming of British sovereignty over all the natural resources water was brought into operation in an extensive, intrusive and complete manner. (Section 2(a) of the Indian Easement Act, 1882). The Britishers individualized water rights, subject to the sovereign rights where the individual positioned in place of the community in relation to the state for the acquisition of water. This principle is deeply entrusted even in the post independence period, where the supply of water has become a monopoly function of the state under the Kumaun and Garhwal Water (Collection, Retention and Distribution) Act, 1975 and U.P Water Supply and Sewerage Act, 1975. In fact the UP Act, 1975 constituted the Jal Nigam and Jal Sanasthan and vested them with the monopoly powers with regard to the extraction and supply of drinking water. This legislation brought all water rights under the control of the state. This legislation made it clear that incase of any conflict state rights would prevail over those of the community and all other right holders.

16. The law on this point as to whether the state can claim sovereign rights over rain water is still clearly not settled. In *M.C.Mehta v. Kamal Nath* (1997) 1SCC 388 the court held that the state is in position of a trusted with regard to the natural resources.

17. Ordinance No.4 of 2003.

18. Section 255A- Provision of rain water harvesting structures – 1. In every building owner or occupied by the Government or a statutory body or a company or an institution owned or controlled by the Government, rain water harvesting structure should be provided by the Government or by such statutory body or company or other institution as the case may be, in such manner and within such
time as may be prescribed. 2. Subject to the provisions of subsection 1 every owner or occupier of a building shall provide rain water harvesting structure in the building in such manner and within such period as may be prescribed. 3. Where the rain water harvesting structures is not provided as required under subsection 2 the Commissioner or any person authorized by him in his behalf may after giving notice to the owner or occupier of the building and recover the cost of such provisions along with the incidental expenses thereof in the manner as the property tax. 4. Notwithstanding any action taken under subsection 3 where the owner or occupier of the building fails to provide the rain water harvesting structures in the building before the date as may be prescribed the water supply connection provided to such building shall be disconnected till rain water harvesting structure is provided.

19. On 25th August, 2003 a petition was filed before the Madras High Court by the VOICE Consumer Care Council against the aforesaid penal provisions. The petition argued that the provision for disconnecting water supply to the building was bad in law as the ‘right to air, water and shelter are the inalienable rights of the citizens’ In response the Tamil Nadu Government clarified that actual disconnection of water supply for houses, which failed to install the rain water harvesting structures was to start after 10th October 2003. The High Court accepted the data set up by the Government, which results in the matter being amicably settled. (‘Provision for disconnecting Water Supply Illegal, Plea in the High Court’, *The Hindu*, August 27, 2003 and ‘Water Supply Disconnection for non compliance only after October 10th, 2003’, *The Hindu*, August 28, 2003).

19a. *Infra* No.21a


20. As per the Extraordinary Gazette no.92/2004 dated 12/1/2004 certain changes were made in the Kerala Municipality Building Rules, 1999. As per this, Chapter XVI was inserted introducing Section 109 A which deals with roof top rainwater harvesting arrangements. As per this section, workable roof top rain water harvesting structures shall be provided as an integral part of all new building. The component of workable roof top rain water harvesting structures should include 1. Roof catchment area; 2. Roof gutters; 3. Down pipe and first flush pipe arrangement; 4. Filter unit and 5. Storage tank.

20a. *Supra* n.13

21. The program was introduced on April 2005 an amount of 34 lakhs has been distributed to 9400 people. (Fund allocated for the provision of building Rain water harvesting structures, Finance Department, Government of Kerala, 2007)


