RESEARCH FRONT

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INNOVATIVE WATER CONSERVATION PRACTICES IN INDIA

Dr. Arjun Wagh- Department Of Geography, P.D.V.P.Mahavidyalaya,Tasgaon Dist.-Sangli

Abstract

Rainwater harvesting is the accumulation and deposition of rainwater for reuse on-site, rather than allowing it to run off. Rainwater can be collected from rivers or roofs, and in many places the water collected is redirected to a deep pit , a reservoir with percolation, or collected from dew or fog with nets or other tools. Its uses include water for gardens, livestock, irrigation, domestic use with proper treatment, and indoor heating for houses etc. The harvested water can also be used as drinking water, longer-term storage and for other purposes such as groundwater recharge.

Key Words: Rainwater harvesting, deep pit, irrigation , treatment, harvested water

OBJECTIVE:

1. To understand the Concept of Water harvesting
2. To highlight the innovative idea of Water Conservation

Water Conservation - There is a worsening trend in water supply nationwide. Taking measures at home to conserve water not only saves you money, it also is of benefit to the community.

Saving water at home does not require any significant cost outlay. Although there are water-saving appliances and water conservation systems such as rain barrels, drip irrigation and on-demand water heaters which are more expensive, the bulk of water saving methods can be achieved at little cost. For example, 75% of water used indoors is in the bathroom, and 25% of this is for the toilet.

The average toilet uses 4 gallons per flush .You can invest in a ULF. Toilet which will use only 2 gpf. But you can also install a simple tank bank, costing about $2, which will save 8 gpf. This saves 40% of what you would save with the ULF toilet. Using simple methods like tank banks, low-flow showerheads and faucet aerators you can retrofit your

By using water-saving features you can reduce your in-home water use by 35%. This means the average household, which uses 130,000 gallons per year, could save 44, 00 gallons of water per year. On a daily basis, the average household, using 350 gallons per day, could save 125 gallons of water per day. The average individual, currently using 70 gallons per day, could save 25 gallons of water per day.

When buying low-flow aerators, be sure to read the label for the actual 'gpm' (gallons per minute) rating. Often, the big box retailers promote "low-flow" which is rated at 2.5 gpm, which is at the top of the low-flow spectrum. This may be needed for the kitchen sink, but we find that a 1.5 gpm aerator works fine for the bathroom sink and most water outlets, delivering the same spray force in a comfortable, soft stream.

Some ideas are enlisted below about water conservation

Rooftop Rain Water Harvesting - All of us who directly consume water are the most important stakeholders in managing water. While many of us urbanites use or waste a lot of water, we rarely make an effort to conserve it. Fortunately, the rainwater harvesting method has provided a solution that can be practiced easily in every household. It is a simple model where the roof acting as a catchment for rainfall, which after flowing through a series of filters and pipes is stored in ground-level containers for direct use or recharged into ground

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water. Given below is a simple formula to calculate the water that can be collected from your rooftop.

Tech Specs Table - An area of 1,000 square feet with 1 inch of rainfall is estimated to yield 550 gallons of water. For an existing building, the cost of water harvesting systems can range from INR10,000 to INR30,000. Designs have been formulated for both pucca and kutcha houses to make it a household activity. In a running model, the stored water has been widely used for irrigation, domestic usage as well as animals. D&D Eco tech services, Jalprapat drillers, water harvesters and Nirmal Jal are some of the reliable service providers of this technology. For new buildings rainwater harvesting has been made mandatory by few state governments like Delhi, Haryana, Uttar Pradesh, Himachal Pradesh, etc.

Ferro-cement Tanks - This is a low cost alternative for expensive water harvesting containers made of masonry, plastic and RCC. It has proved highly effective in high rainfall regions where large amount of water need to stored in clean form. These tanks requiring materials like sand, cement, mild steel bar and galvanized iron wire mesh, can be easily constructed by semi skilled labours. It's light in weight and can be moulded into any shape required. It is believed to last for around 25 years with little maintenance. Picture above shows a ferro-cement tank under construction. It can be appropriate for use in Indian villages and disaster prone areas as its fireproof and tough in build.

Cycle Run Water Pumps - A saver of time and cost of electricity and fuel, this technology utilizes human power generated by pedalling a bicycle to lift water from streams, ponds, canals and wells. When cycle is pedalled, it creates an up and down motion of pistons which pressurizes water flow to outlet. A portable model which can be installed on site has also been developed. Designed for small scale farmers who don't have capacity to afford costly diesel rum motors, this arrangement can bring a flow of 100 litres per minute. The complete unit made of cast iron and aluminium costs from rupees 2500 to 7000. These pumps have also supported women, kids and old people who at times found operating hand pumps in bend position a strenuous task. Some models have replaced bicycle by steppers, making pumping water a healthy and fun activity. In India, it was conceptualized by poor farmer from a village of West Bengal, If made applicable in urban areas, this concept can do wonders in making people realize importance of water and lose some calories.

Joy Pumps - Ever imagined filling up an overhead tank by kids playing around? This innovation was designed to mitigate water scarcity problems in villages with no clean surface water source, no electricity and poor monetary capacity. Attached below a merry-go-round wheel or a see-saw, is an arrangement similar to a conventional hand pump. As children ride on these wheels, groundwater is drawn and tank is filled. It can also be used to pump water from bore wells and large storage tankers. It can be installed even at far off places and has easy maintenance. It's basically a community structure and can be set up in schools, parks, villages and relief camps. It has been used in developing countries like India and Africa. Span pumps pvt limited, a Pune based company is designing such pumps in India.

Most of the open wells and tube wells in coastal areas contain salty water due to seepage of sea water. Rainwater harvesting is a viable option for solving the issue of drinking water, but construction of rainwater overhead tanks is unaffordable for marginal farmers. Rainwater is collected from the roof tops of houses and stored in a pressure tank on the ground and with the help of PVC pipes; water is lowered below sea level.

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The water is retained in the underground water column which is then harvested during summer by a simple piston pump or motor by constructing a tube well in the vicinity. It has proved successful in diluting recharging ground water in coastal areas of Kerela and Antoji has installed 150 tanks in different parts of Kerala.

Water Wheel - This innovation comes from a foreign visitor who was inspired by women from villages of Rajasthan, who carried round earthen matkas on head for long distances in hot weather. This invention has made carrying water not only an effortless but fun activity. It is a round wheel shaped storage tanker with an attached handle on top to provide painless mobility. It has already become popular in villages of Gujarat, Madhya Pradesh and Rajasthan. Designed to reduce the drudgery and save time of working women, water wheel can store upto 10 to 50 litres of water in hygienic conditions. It's designed for lasting on rough terrains and made from high quality plastic. It's affordable too costing around 2000 rupees. It was innovated by a US based social entrepreneur, Cynthia Koeing under an organisation called Wello.

Advantages - Rainwater harvesting provides an independent water supply during regional water restrictions and in developed countries is often used to supplement the main supply. It provides water when there is a drought, can help mitigate flooding of low-lying areas, and reduces demand on wells which may enable groundwater levels to be sustained. It also helps in the availability of potable water as rainwater is substantially free of salinity and other salts. Application of rainwater harvesting in urban water system provides a substantial benefit for both water supply and wastewater subsystems by reducing the need for clean water in water distribution system, less generated storm water in sewer system,[1] as well as a reduction in storm water runoff polluting freshwater bodies. There has been a large body of work focused on the development of Life Cycle Assessment and Life Cycle Costing methodologies to assess the level of environmental impacts and money that can be saved by implementing rainwater harvesting systems.

More development and knowledge is required to understand the benefits rainwater harvesting can provide to agriculture. Many countries especially those with an arid environment use rainwater harvesting as a cheap and reliable source of clean water.[2] To enhance irrigation in arid environments, ridges of soil are constructed in order to trap and prevent rainwater from running down hills and slopes. Even in periods of low rainfall, enough water is collected in order for crops to grow.[3]Water can be collected from roofs, dams, and ponds can be constructed in order to hold large quantities of rainwater so that even on days where there is little to no rainfall, there is enough available to irrigate crops.

New Approaches - Instead of using the roof for catchment, the Rain Saucer, which looks like an upside-down umbrella, collects rain straight from the sky. This decreases the potential for contamination and makes potable water for developing countries a potential application.[8] Other applications of this free standing rainwater collection approach are sustainable gardening and small plot farming.

A Dutch invention called the Groas is Water boxx is also useful for growing trees with harvested and stored dew and rainwater.

Traditionally, storm water management using detention basins served a single purpose. However, Optimized Real-Time Control lets this infrastructure double as a source of rainwater harvesting without compromising the existing detention capacity. This has been used in the EPA headquarters to evacuate stored water prior to storm events, thus reducing

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wet weather flow while ensuring water availability for later reuse. This has the benefit of increasing water quality released and decreasing the volume of water released during combined sewer overflow events.

Generally, check dams are constructed across the streams to enhance the percolation of surface water into the sub soil strata. The water percolation in the water impounded area of the check dams, can be enhanced artificially many folds by loosening the sub soil strata / overburden by using ANFO explosives as used in open cast mining. Thus local aquifers can be recharged quickly by using the available surface water fully for using in the dry season.

Finally, it should be noted that installing low-flow aerators, showerheads, tank banks and other water-saving devices usually is a very simple operation which can be done by the homeowner and does not even require the use of tools. Water conservation at home is one of the easiest measures to put in place, and saving water should become part of everday family practice.

Conclusion and Suggestions

The development of modern water-saving agriculture is at a critical period with the traditional technology upgrading intertwined with the high-tech development.

More emphasis on the traditional technology application and upgrading depend on high-technology. Great attention should be paid to the research and exploitation of modern water-saving technology, using information technology, biotechnology and other high-tech and new materials. Secondly, modern biology water-saving technology, an important direction for future water-saving agriculture development, is also a hotspot and emphasis for current research.

Water-saving irrigation technology, non-traditional water resources, exploitation technology, and dry-land water efficient technology are the keys to recent research of modern water-saving agriculture technology.

The main elements of its research should be focused to solving difficult problems of technology applications process, which is also an emphasis that we should strongly support and increase investment starting from now.

Finally, technical system integration and demonstration is the key stage for technology into production application, but also a weak link of water-saving agricultural technology development in China.

To strengthen and development of this work, it is conducive to transform technology and large-area applications

References

1. Amin S, Sadeghi JM, Salimi Manshadi MA (2004). Economic feasibility of saving water through controlling outflow of ghanats. Irrig. Drain. Syst. 18: 145-154
2. Rural Water Conservancy Division of Water Resources Ministry (2001). Looking back to Ninth Five-Year Plan of water-saving irrigation. Beijing, China: China Water-power Press
3. Jing RL, Li Y (2004). Biological water-saving development strategy for China. Essays of Water-saving Agriculture For
4. Sharma E, Rai S C, Sharma R. 2001. Soil, water and nutrient conservation in mountain farming systems: A case study from Sikkim Himalaya. *Journal of Environmental Management* 61(2):123–135. um in China
5. Mishra PK, Rai SC. 2013. Use of indigenous soil and water conservation practices among farmers in Sikkim Himalaya. *Indian Journal of Traditional Knowledge* 12(3):454–464.