Journal of Water Resource Engineering & Pollution Studies
Volume 7, Issue 1, January- April, 2022

A Study on Conserving Water to Inundate Hilly Areas

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Abstract

The most important component of the biotic world is water, sometimes known as a universal solvent. People who live in plains and coastal locations may easily deal with water issues, while those who live in hilly places experience serious challenges owing to a lack of water resources. Unpredictable rainfall, repeated drought, and the occasional depletion of water resources plague many hilly regions, as well as places like Jammu and Kashmir and numerous cold deserts. Due to the unfavourable weather, crop yields are low in these places. Water conservation is critical due to the demand for water in agriculture and for drinking. Water is a constant challenge for communities in mountainous places, not only for agriculture but also for drinking and domestic reasons. Rainwater and spring water are the two most common sources of water. In these places, ground water is in short supply and is frequently found at a greater depth. Tube wells, canals, and even lift irrigations have limited utility in steep terrain. As a result, water conservation is critical. Rainwater is typically collected and used for irrigation and home uses. Rooftop water harvesting is the most efficient way to save water, as well as the most cost-effective and productive. Kuls and bamboo drip can also be utilised for water transportation.

Keywords: *Rainwater Harvesting, Roof-Top, Kuls, Biotic, Canals and Lift Irrigation*

INTRODUCTION

Although water makes up over three-quarters of the earth's surface, not all of it is suitable for human use. Ocean and seawater cannot be considered drinking water, and only a small portion of it can be used for various reasons. As a result, there is a constant scarcity of water that is unfit for drinking, household, or industrial use. Water-scarce areas of the globe were able to overcome this difficulty by harvesting what little rainwater they did obtain owing to precipitation. This gradually expanded to locations where there was plenty of rain. As a result, a unique day rainwater collection system was installed in certain places. Using the rainwater harvesting system provides certain advantages to the community. To begin with, rainwater harvesting allows us to better utilise a water resource. It is required to do so since drinking water is not easily renewable and it aids in the reduction of abuse.

Rainwater collected in a rainwater harvesting system can be used for a variety of non-drinking purposes. This results in a significant savings in power bills for many homes and small businesses. From an industrial standpoint, rainwater harvesting can provide enough amounts of water for a variety of operations without depleting local water sources. As such, there is no need for building new structures for the rainwater harvesting plant. The majority of rooftops serve as usable catchment areas that can be connected to the harvesting system. This also helps to lessen environmental impact by minimising the need of fuel-powered machinery.

After they started rainwater harvesting in Maharashtra's Kadavanchi hamlet, crop production soared by 200 percent. Rainwater collection can help enhance productivity in mountainous areas, which would boost the local economy. Rainwater harvesting is the collection and storage of rainwater for on-site and off-site reuse rather than letting it run off as a wasteful drain runoff. Rainwater can be collected from rivers, rooftops, and many other locations, with the water being directed to a deep pit (borehole, shaft, or well) for ground water recharge, a collection tank with percolation, or accumulated from dew or fog with other methods. Water for replenishing ground levels, parks, gardens, cattle, fields, irrigation, and residential usage after adequate treatment, such as chlorination, sedimentation, and filtration, is commonly embraced as a common layperson practise that can be cost effective for consumers. Farmers in Baluchistan (now Pakistan, Afghanistan, and Iran), Kutch, India, employed rainwater gathering for agricultural fields around the third century BC Rainwater harvesting was done by Chola kings in Tamil Nadu in the past. Rainwater was gathered in Shivaganga tank from the Brihadeeswarar temple in Balaganpathy Nagar, Thanjavur, India. The Vrnam tank was created in the Cuddalore district of Tamil Nadu during the later Chola period (1011 to 1037 CE) to collect water for drinking and irrigation. Vrnam is a 16-kilometer-long tank with a 41,500,000-m3 capacity. Rainwater harvesting was once practised in Indian states such as Madhya Pradesh, Maharashtra, and Chhattisgarh. Ratanpur, in the state of Chhattisgarh, has approximately 150 ponds, with the majority of the water being used for agricultural purposes.

There are generally two methods of harvesting rainwater:

Surface runoff harvesting

In urban regions rainwater flow away as surface run off. By using specialised methods, this runoff can be collected and used for recharging aquifers, as well as collected to be used during dry periods throughout the year in most hilly places.

Roof-Top rainwater harvesting

It is a mechanism gathering of rainwater where it falls. Rooftop harvesting uses the roof as a catchment system, collecting rainwater from the structures' roofs. It can also be collected in a tank or diverted to a system for artificial recharge. This practise is both cost-effective and productive, and when used correctly, it can help to improve the area's groundwater level.

METHODOLOGY

The Himalayas contain the most ice and snow outside of polar regions and are the source of Asia's ten largest rivers. Climate change is causing a rapid decrease in the number of Himalayan glaciers. Water availability (amounts, seasonality), biodiversity, ecosystem boundary shifts (tree-line movements, high-elevation ecosystem changes), and overall feedbacks (monsoonal shifts, soil carbon loss) are all being affected by the declining effects of rising temperatures and ice and snow in the region. Seasonal change will have an environmental and social impact on human populations in Asia, increasing uncertainty in water sources and agricultural production. To identify and implement reduction and adaptation commands, a natural understanding of climate change necessitates the creation of regional and local-scale thesis. The Greater Himalayas' climate change threat can only be met by increasing regional collaboration in scientific studies and policy development. (Jianchu Xu et al., 2009).

The Himalayas, known as "the world's terrace," feature the planet's most extensive and unforgiving high-altitude zones, as well as the greatest expanses of glaciers and frozen water outside of the polar regions. The region and its water sources play a chief role in global atmospheric circulation, biodiversity, rained and irrigated agriculture, and hydropower, as well as in the generation of commodities exported to sell worldwide. A variety of driving forces are currently threatening the region's water sources. Global warming is reducing the amount of snow and ice, which has major implications for downstream water supply in the short and long term, as snow and glacier melting contribute up to 50% of the average annual flows in rivers. The warming in the broader Himalayas has been substantially greater than the global average: for example, 0.6 degrees Celsius each decade in Nepal compared with a global average of 0.74 degrees Celsius over the last 100 years. Precipitation changes are ambiguous, with both growing and decreasing trends in various sections of the region. Such as extremely strong rainfalls leading to flash floods, landslides and rubbish flows. There is a significant information vacuum about the short and long-term effects of climate change on water and risks in the Himalayas and their downstream river basins. The Himalayan region has been excluded from most studies due to its convoluted topology and a lack of appropriate rain gauge data. Building survey schemes for snow, ice, and water; downscaling climate models; implementing hydrological models to estimate water availability; and establishing basin-wide plots that take water requirements and socioeconomic development into account are all necessary steps in closing the knowledge gap. Floods, landslides, and droughts caused by climate change will place significant strains on the income of mountain people and downstream populations. Adoption policies must be improved, and structural differences that make adoption by impoverished individuals more difficult must be addressed. Local awareness, introduction, and approach inside familiar and environmentally friendly systems, as well as improving the operating of businesses suited for adoption, are required. To aid in the improvement and utilisation of sound programmes, sound science must be combined with dependable, significant, and accurate awareness (Mats Eriksson et al., 2009).

One of the world's largest fresh water supply originates in the Himalayan mountain range. The Indus, Ganges, Brahmaputra, Irrawaddy, Salween, Mekong, and Yangtze are the major rivers. While one or more of these rivers and its tributaries might generate devastating floods in some years, their waters are also the source of one of the world's most pressing population needs. The dangerous elements of slope weakness, excessive sediment discharge, excess flow, and design liability to seismic are partially offset by the vast hydroelectric potential (Jayanta Bandyopadhyay And Dipak Gyawali,1994).

from the ice to the village The kuls frequently run for long distances, down steep mountain slopes and through crags and cracks. Some kuls are ten kilometres long and have been around for generations. Because the kuls naturally form channels, rainwater can be collected in mountainous areas and diverted and transported to the kuls, which then end up in a reservoir in the low lying section of the region.

Because kuls are widely available as transportation conduits because they are natural, this strategy is cost effective. A similar strategy has been used in the Sipti region of Himachal Pradesh, which is a cold desert noted for agricultural activity. Although this strategy is conventional, it can have a more promising outcome when combined with modern ideology and procedures.

With the introduction of remote sensing equipment and their inherent characteristics, it has also been possible to develop a method for compiling an agricultural field plan of a hilly region watershed using geographical information systems (GIS). Many-seasonal (monsoon-Kharif and post-monsoon-Rabi) and multi-sensor remotely sensed data were used to create a map of the watershed's land use pattern. The converted classified images, as well as the relevant watershed resources, were entered and saved as specific layers in the GIS before being characterised and co-registered to a regular 30m grid. Information-based rules were created based on the informed assumptions of multidisciplinary specialists and field rectification, as well as local field use patterns. These rules were used to manage the data in order to disfavour various spectrally indistinguishable data classes, determining the land use/cover categories of the Kharif season under the cloud and its shadow regions. We can use this technique to conduct a thorough study of the land use patterns of any hilly terrain in order to learn about its basic topography and characteristics so that a proper and effective method of water harvesting can be used (Adinarayan & Ramakrishna,

CONCLUSION

If we store rainwater collected from different building and surface area rooftops in a common storage tank rather than a separate one, we will save money in the long run. The low-lying area can be used to build a large storage reservoir. When necessary, this water is delivered to agricultural fields via bamboo drips, kiaries, or centrifugal pumps.

As an alternative method of water transfer, syphon can be used. We are able to store large amount of water that is deposited in the low lying area in the large storage reservoir, thus ,we can supplement the capacity of primary canal used for irrigation in the times of scarcity and increase the crop productivity by a reasonable rate. Furthermore, because there is an abundance of water in this area, it is possible to grow cash crops. However, such a reservoir serves a few other purposes, such as water supply as a common outlet and preventing silting and erosion in low-lying areas.

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