

Cloud Harvesting and Water Storage Using Nature Resource

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Abstract:- In modern civilization where irrigation contributes to a major concern for the development of the country's economy in most of the backward countries like Africa face difficulties in water resource management. Apart from conventional resources to harvest water from the nature like lakes and rivers since their adoption is not present everywhere in the country leads to insufficiency in water storage management as well in harvesting. This paper presents a new approach of harvesting water from a natural renewable resource that contributes to the change we redefine the world.

Keywords:- Civilization; Irrigation; Resource; Harvest; Clouds;

I. INTRODUCTION

In the Quest of water storage in modern day facing a major concern in locations with drought and water scarce issues. Apart from conventional methods like harvesting water through roof tops of local houses, building and storing water to tank to use after and it's a big dream to multiply the storage and area of harvesting rain water[1] for people to use. However this will also give an additional disadvantage during summer seasons when temperature increases the chances of evaporation of water also rapidly increases. Apart from harvesting and storage rain water it's a big challenge to protect water from natural enemies and other minor issues. On other hand harvesting a cloud for water in winter season could help reducing ground water consumption[4] and improves the utilization of nature.

II. A BRIEF HISTORY OF WATER HARVESTING IN INDIA

Water harvesting in ancient India is far more advanced than present time. The concept of water conservation was imbedded into the culture fabric, also revering water as a goddess. Such was the harmony between humans and Mother Nature. Chanakya's Arthashastra describes in detail about water channels, dams and bunds for irrigation including water storage and supply system of the vast Mauryan Empire. These were well managed and subject to stringent rules and regulations. The Cholas introduced advanced irrigation systems that led to creation of vast wealth in the Deccan region. The Cholas king karikala built the grand anicut across the river Cauvery to divert water for irrigation. On the other hand the presence of the grand East Reservoir and series of reservoirs excavated earlier suggests

that the harappans had a good water harvesting system. Harvesting rain water as well storage of water was a engineering marvel even from the ancient days in India as well different parts of the world. Cultivation with harvested water was a most dominant way of irrigation in most of the ancient world rather than Earthening ground water or channeling river water to yield crops.

III. METHODS OF HARVESTING CLOUDS

One of the more innovative methods of gathering freshwater is harvesting it from clouds. When the base of the cloud is in contact with the ground it is called fog and fog collectors work best in coastal areas where the water can be harvested as fog moves inland driven by the wind.

A. Cloud Seeding

Cloud seeding helps that process along, providing additional "nuclei" around which water condenses. These nuclei can be salts, calcium chloride, dry ice or silver iodide, which the Chinese use. Silver iodide is effective because its form is similar to ice crystals. Calcium chloride is often used in warm or tropical areas. There are three different types of cloud seeding.

- Static Cloud Seeding that involves spreading a chemical like silver iodide into clouds. The silver iodide provides a crystal around which moisture can condense.
- Dynamic Cloud Seeding aims to boost vertical air current, which encourage more water to pass through the clouds, translating into more rain. The process is considered more complex than static clouding seeding because it depends on a sequence of events working properly.
- Hygroscopic Cloud Seeding disperses salts through flares or explosives in the lower portions of clouds. The salts grow in size as water joins with them. In his report on cloud seeding, cotton says that hygroscopic cloud seeding holds much promise, but requires further research.

B. Cloud Catcher

- Cloud catchers are used to attract the moisture in air and turn them to water droplets with the help of gravity and surface tension. From past few Years cloud catcher technology is adopted in several areas across the globe to reduce the scarcity of water.
- The harvesting structures are prebuilt upon the hill tops adding advantage of exposing to more moisture. Conventional type of harvesting techniques yield a very small amount of water under worst case like a 3liters per

day provided all atmospheric conditions are quite normal and operable with at-least 70% efficiency. Water harvested from the cloud are pure to drink however could affect the health on long stand if taken without filtration and without processing.

IV. FACTORS EFFECT THE VOLUME OF WATER EXTRACTED

- Frequency of fog occurrence is a function of atmospheric pressure and circulation, oceanic water temperature, and the pressure of thermal inversions.
- Fog water content is a function of altitude, seasons, and terrain features.
- Design of fog water extractor is a function of altitude, seasons and terrain features and direction, topographic conditions, and the materials used in the construction of the fog collector.

V. NATURAL RESOURCE TO HARVEST RAIN WATER

Apart from conventional methods of harvesting rain water like recharging the ground water through rooftops, storing rain water to large containers that could cover almost 70% of our daily needs like washing clothes, dish washing as well for drinking if filtered. Investigation through proper care has found that water can also be harvested through clouds by using special techniques.

A. Roof Tops Harvesting in cities

Rooftops of buildings in cities are conventionally used for rain water harvesting while rainy season and can also be combined with fog harvesting[2] technique to yield maximum quantity covering both rainy season as well winter season. Where rain season water could be used for commercial house purpose and fog harvested water[3] could be used only drinking purpose because of its purity compared to rainy water and could reduce the cost per annum when combined with mineral water. On other hand tall building add advantage for fog harvesting compared to installation of system on hills or mountains where extra cost as well care is to be taken to make system stable and susceptible to environmental disasters.

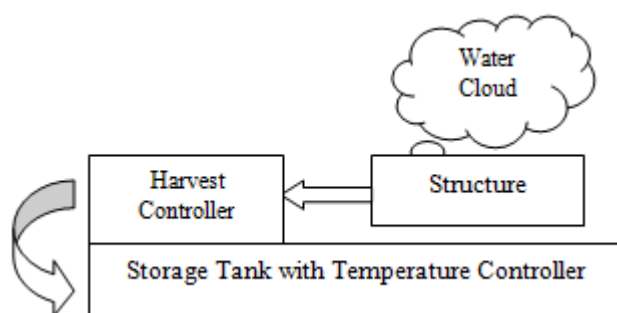


Fig 1:- Proposed cloud harvesting technology block diagram.

B. Harvesting upon Hills and Mountains

The proposed structure is specially built to harvest upon the hills or mountains with adjustable parameters to control the flow and evaporation as shown in the Fig.1. Furthermore the storage of harvested water is stored in a specially build vessel to avoid evaporation and to avoid temperature changes in water. Solar photovoltaic systems adopted have improved the performance and efficiency of the system by 8% while conventional power source always suffers a downfall in price hikes. Apart from unseasonal rain clouds and other sorts of artificial clouds that does contains harmful bacteria as well chemicals technology adopted has 40% chances of detecting proper source avoiding unnecessary risk of contamination of natural water furthermore the artificial habitat preservation system improves the chances of avoiding wastage of water controlling the flow through the specified path.

VI. CONCLUSION

The preferred structure would help in harvesting with an efficiency of 87% with zero maintenance of the system. Furthermore the system adopts 96% of natural and renewable resource for storage of water apart from irregularities in the surrounding temperature. On a whole the adoption of the system could improve the irrigation and is specially adopted and suited for providing water in drought prone areas. With rise in demand towards drinking water this could solve the resource problems in most of the parts of the countries.

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