International Rainwater Harvesting Alliance
Alianza Internacional para la Gestión del Agua de Lluvia *(IRHA)*
Alliance Internationale pour la Gestion de l'Eau de Pluie *(IRHA)*

bRAINstorming

NEWSLETTER N^{O} 31 – JUNE 2010

Our newsletter focuses on all activities concerning rainwater harvesting, the International Rainwater Harvesting Alliance (IRHA) and its partners.

Topic of this issue: Alternative forms of Rainwater Harvesting

Editorial

Dear Rainwater Harvesters, Readers, the IRHA Members and Friends,

Though the IRHA has always focused its work on harvesting the rain, there are other ways of utilising the moisture in the air.

In some areas of the world, there just is not enough rain in the year to support communities through rainwater harvesting alone. However, rather than turning to piped water which is expensive and sometimes impractical, we can still look to the sky to supply us with the much needed water.

Snow, dew and fog can all be captured and stored to provide a cheap, safe and sustainable water supply to many communities around the world.

This Newsletter aims to give an introduction into these alternative forms of rainwater harvesting, including how they work, where they can be accomplished and an interesting case study of a fog harvesting project in Chile.

We also have contributions from two experts in their field: Dr. Robert Schemenauer from FogQuest, a Canadian charity specialising in fog, dew and rain collection; and we had the honour and pleasure of meeting Jérôme Kasparian, an optical physicist and senior researcher at the University of Geneva, who is developing the use of lasers to produce rain.

Hannah Price

‘Pretty Snow Flakes’ by Water Harvesters, one of our IRHA Members

Nature has blessed us with countless bounties,
To stop abusing it, should be our prime duty;
Let's unite to save the resources from depletion,
Be it deforestation or ground water exploitation

Save Water …Live Better.

Anjali Chugh
CEO of Water Harvesters

Click here to read the full poem.

Snow Harvesting

What is it?


Snow storm in New York, courtesy of Water Harvesters

Snow harvesting is the collection of snow during the winter that can be stored and used in the warmer, drier parts of the year. The water can be used either to recharge local groundwater aquifers or for drinking and irrigation purposes.

Methods

To store the snow, a pit, usually around 6-8 metres in diameter and 10 metres in depth, is dug. Snow is placed in the pit at a depth of around 2-3 metres, compacted and then covered with earth. The earth acts as an insulator, allowing the snow to survive while the temperature outside increases.
A bamboo tube is used to tap the snow for water. This is inserted into the snow, about 50cm above the base of the pit, so as the snow gradually melts it trickles along the tube and flows out of the pit into a waiting pot/bucket[1].

A different form of snow harvesting involves capturing it in the soil, allowing it to melt gradually. This means more moisture is available along the soil profile, as water is able to percolate deeper into the soil, and at the same time, erosion is reduced or even eliminated.
This can be accomplished through practising conservation tillage; rather than removing plant residues like in traditional farming, leaving residual plant stubble allows snow to be trapped next to the soil. The no-tillage method is affordable as it requires no technologies or machinery, however, in the first few years herbicides are needed to control the weeds. After 4-5 years, herbicide use reduces and ceases and farmers can expect an increase crop yield[2].

Where is it used?

The snow-pit form of rainwater harvesting is predominantly used in the region of the Himalayas, including Himachal Pradesh in Northern India, and in China. Capturing snow for use in agriculture is often found in Northern Kazakhstan.

Dew Harvesting

What is it?

Dew harvesting makes use of the water vapour that is naturally found in the atmosphere. When water particles in their gaseous state come into contact with a cool enough surface, they will condense and form droplets. The collection of these droplets is the basis of dew harvesting[3].
This form of rainwater harvesting has been carried out since ancient times and examples of its use can also be found in nature (see picture below). Vegetation in desert regions has evolved so it is able to harvest the moisture in the air. Dew harvesting structures also have the advantage of being able to capture rainwater during periods of rainfall.

Methods

Dew harvesting equipment commonly consists of a piece of mesh that is held up vertically and perpendicular to the wind. It must be mesh rather than solid material so the water-leaden wind can pass through it, leaving the water behind. The bigger the surface area of the mesh, the more dew can be harvested. There needs to be a gutter below it so the water droplets can run down and collect. The quicker the water droplets runoff the mesh and into the gutter the better, as the longer they stay on the mesh, the more likely they are to warm up and evaporate back into water vapour[4]. The equipment needed to harvest dew is usually simple and low cost, and as it is vertical, it takes up much less space on the ground than a traditional rainwater harvesting structure would.

Moss is able to harvest dew
Source: Tyler (2010)

It is also possible to harvest dew on the roofs of buildings; for this the roof needs to be made out of the correct material, metal appears to work best and the use of special slippery paint helps the water particles run down the roof faster, and be sloped at the right angle[5].

Where is it used?

Dew harvesting can be used where rainfall is too low for traditional rainwater harvesting techniques. It is often utilised in arid and semi-arid zones at the edge of deserts where the air is very humid but there is very little rainfall. Areas where it is currently being used include India, Mediterranean Islands and the Middle-East.

Fog Harvesting

What is it?

Fog harvesting has similar principles to dew harvesting; as fog droplets crash into a mesh, they stick, and, once enough droplets have crashed, a drop forms. It takes 10 million fog droplets of around eight microns in diameter to form a drop of water the size of a matchhead.

Methods

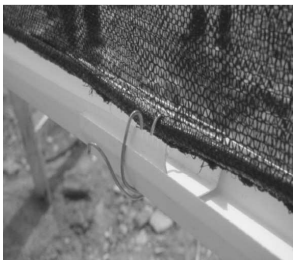
To collect the fog, large, flat nets are erected between two poles, perpendicular to the wind (see picture). The nets are usually made of fine-mesh nylon or polypropylene netting. Fog droplets are intercepted on the nets, once enough droplets have been caught a water drop will form; this then flows down the net into a trough at the bottom[6].
The nets are usually placed on high ground, this means that pipes can transport the captured water down from the nets to the villages using gravity, without the need for any extra energy. After the initial investment of the materials needed, this is a low cost method of obtaining drinking water; the only requisite is that they are regularly maintained by the local population.

Source: National Geographic (2009)

Where is it used?

The ideal settings for fog harvesting are arid or semi-arid coastal areas whose offshore waters have cold currents. The other necessary geographical feature is a coastal mountain range within 15 miles of the coast that rises 400 to 900 metres above sea level. At these altitudes, the concentration of droplets in fog banks is much greater than in those that come in at sea level[7].
Fog harvesting is most prevalent in South America, especially in Chile and Peru, as the Humboldt Current, which moves north up the Chilean coast, gives the required conditions. It is also found in central Asia, predominantly in Nepal, Yemen and India, as well as in South Africa.

Dr. Robert Schemenauer, Executive Director of FogQuest



Trough to collect fog water

FogQuest is a non-profit Canadian charity that uses innovative fog and rainfall collectors to provide a water source for rural communities in developing countries. They carry out projects in numerous countries, including Chile, Ethiopia and Nepal, particularly in areas where conventional water sources such as wells, rivers and pipelines are unreliable or simply not available.
Dr. Schemenauer, their Executive Director and expert in the area of fog collection, has kindly written an article for bRAINstorming, giving an excellent insight into the art of this underused technology. He introduces us to fog collection and its applications, before going on to discuss the quality of fog water and also how the wind can affect both fog and water collection.

You can find his article here.

Case Study

Chungungo

Source: Dale (2003)

One of the most famous examples of fog harvesting is in Chungungo, a small fishing village at the bottom of the El Tofo Mountain in northern Chile. Annual rainfall in the village is just 100mm and there is no natural source of clean water nearby, leaving the inhabitants dependent on water delivered once a week by truck. This water was of poor quality, expensive and with a weekly supply of 10,000 litres, around 3 litres/person/day, there wasn't enough to meet people's needs. Furthermore, when the roads were impassable, their water supply was cut[8].
The location of El Tofo on the coast of Chile means it is ideally positioned to take advantage of fog harvesting. In the late 1980s fog collectors were constructed on El Tofo, initially the idea was to utilise the fog to irrigate seedlings on the hillside, with the aim of reforesting the area so it would once again become a self-sustaining cloud forest[9].
However, five years after they were first introduced, the villagers of Chungungo pushed for a pipeline to be sent down the mountain, with the hope that this could give the village a sustainable water supply[9]. In March 1992 the pipeline was completed[10] and the fog, from 80 collectors, began to supply the village with 10,000 to 15,000 litres of water a day[11].
After their installation, the villagers of Chungungo received around 30 litres of water/person/day from the fog collectors, enabling them to broaden their diets and change their lives. This was one of the first examples of collecting fog; its success caused the spread of the technology around the world and it is now utilised in dozens of countries. Read more.

Meeting with Jérôme Kasparian from the University of Geneva, Switzerland

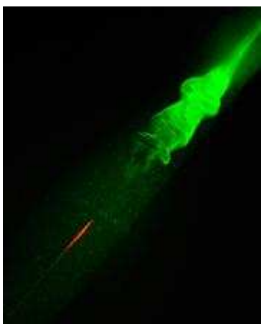


Image of the laser

On the 18th May, the IRHA team had the privilege to meet with Jérôme Kasparian, an optical physicist and senior researcher at the University of Geneva, who is developing the use of lasers to produce rain. Kasparian and his colleagues are researching into laser technology that could be used in the future to encourage condensation in the atmosphere, leading to precipitation. It was an extremely informative meeting and we are keen to follow this innovative technology and its potential future uses.

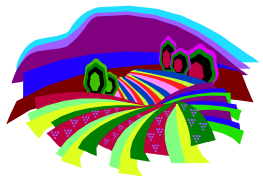
We have written a full article Mr Kasparian's visit to the IRHA Secretariat which is available here:

IRHA News

Rainwater Harvesting at the Heart of Micro-Farming and Food Security in Watershed Development Programmes

Dear Colleagues, the IRHA has started taking subscriptions for our **new training session**, taking place in Maharashtra, India. Though previously announced for July, we have changed the date in order to avoid the monsoon period. The course will now start on the **9th September**, 2010. The training will develop the capabilities of professionals to implement rainwater harvesting projects and measures for improved food security in micro-farmed, semi-arid regions. All details can be found at www.irha-h2o.org and we will be pleased to answer your emails. Don't delay your subscription; the number of participants is limited!

We are pleased to welcome two new members to our network:



The **Abhiyaan Foundation,** based in India, and **RainWater Cambodia** (RWC); two NGOs working to improve access to water and sanitation in their areas.

Join us online and get involved!

If you have any ideas, case studies or questions about rainwater harvesting, please feel free to share them with us on our new **Facebook** page. We want this to be interactive, so the more contributions the better! In return we will keep you up-to-date on all the activities currently going on at the IRHA, including updates of current projects and details on ones we hope to implement soon.

Upcoming Newsletter

Our next Newsletter will look specifically at the work done by our IRHA Members as well as the contribution of some private sector members in the development of rainwater harvesting. If you would like to contribute to this Newsletter, please send us you articles, photos or comments to the email below. We thank you in advance for taking the time to enrich the Newsletter and help the IRHA spread the word of rainwater harvesting to our 3521 readers.

References

This Newsletter was written with the help of several articles in the area of alternative rainwater harvesting. A list of those used can be found here.

Become a Member

The IRHA Members benefit from our extensive network and contribute to increasing the global use of rainwater harvesting.

Become a Member online:

Visit our website at:

http://www.irha-h2o.org/en/become_a_member.html

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