

ICE STUPAS- aka ARTIFICIAL GLACIERS

Harshitha S.



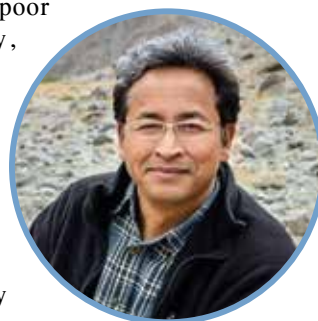
Source: icestupa.org

Ice stupa

LADAKH is a cold desert, nestled in the idyllic state of Jammu and Kashmir. The word desert evokes imagery of searing heat, sand and mirages. But Ladakh is the opposite of all this. Its rugged terrain dips down to about the negative value of the normal temperature in the country. For instance if the average temperature in the country is 30°C, the temperature in Ladakh is -30°C. In this rugged terrain there are only very few species of animals and plants that exist. Those are the woolly yak and some amazing lichens.

In this rugged terrain there are some men of great conviction and determination. Two of them are **Sonam Wangchuck** and **Chewang Norphel**.

Born into a poor Ladakhi family, Wangchuck faced a lot of difficulties during his education. But he bore them all with immense grit and sheer willpower. Today he is remembered as a great inventor and educator.



Sonam Wangchuck

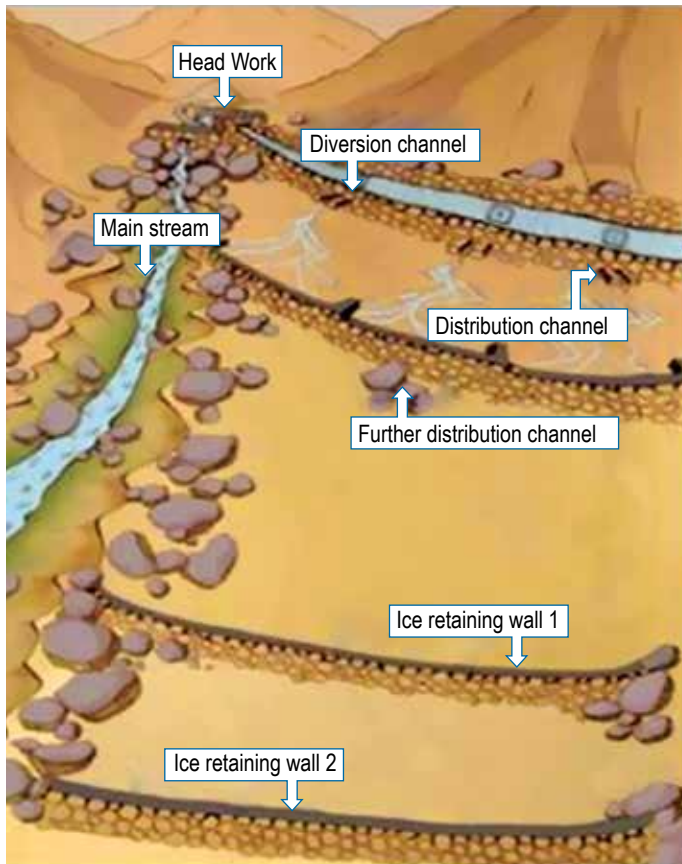


Chewang Norphel

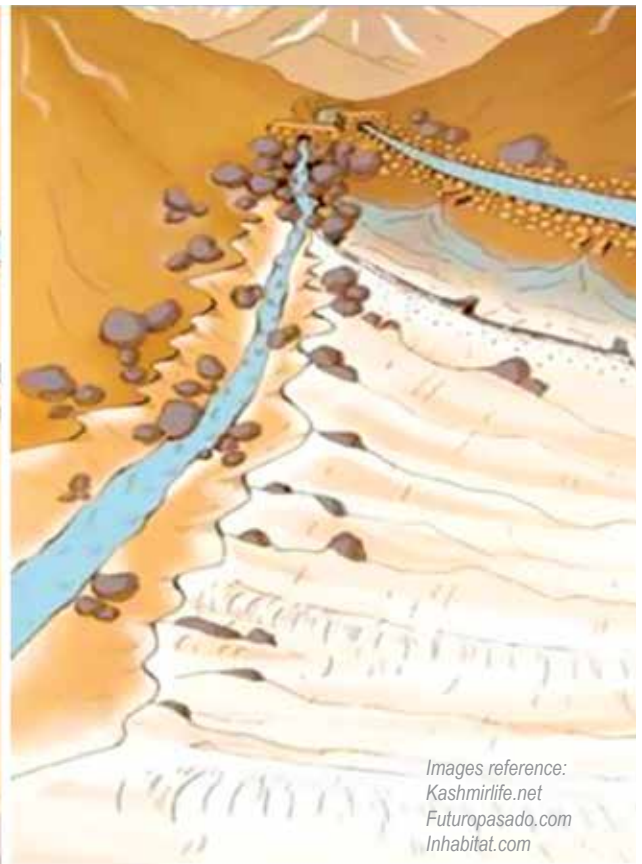
Like the rest of the world, Ladakh faces water problems. But the problem in Ladakh is different from that of other places. Winters are extremely cold and the entire terrain is under a

great cover of ice. And during summer and spring there is a scarcity of fresh water. The majority of the population depends on farming, and their main source of irrigation water is the water that comes from the melting of snow and

Mechanism of an artificial glacier



Stone structure to create an artificial glacier



Artificial glacier formed in winter

Images reference:
KashmirLife.net
Futuropasado.com
Inhabitat.com

glaciers. Because of global warming, the glaciers are receding quickly and as a result, farmers face a lot of difficulty in getting adequate water. On the other hand, a lot of water gets wasted during the winter months as, due to the severe cold climate, farmers cannot grow any crops in that season.

This was a real trouble until some innovators like Wangchuck and Norphel came up with the idea of Ice stupas.

It struck them that the water that melts from natural glaciers due to high temperatures in summer goes to waste as it flows into the river. Instead, if this water can be stored in summer and autumn so that it can form a glacier in winter, then this artificial glacier would melt in spring and provide water to the villagers at the right time.

“So I thought that if we could conserve this water in the form of ice, it can be of help to farmers to

some extent during the irrigation period, particularly during the sowing season. The artificial glaciers, being quite close to the villages, melt earlier than the natural glaciers. Also, getting water during the sowing period is the most crucial concern of the farmers because the natural glaciers start melting in the month of June and sowing starts in April and May,” Norphel says.

He came across this idea when he saw an open tap. The tap was kept open during the winter to prevent it from bursting due to the pressure of the ice. The flowing water had frozen and resembled an icicle. This is when he came up with the idea of artificial glaciers.

“The main technique used to create artificial glaciers is to control the velocity of water as much as possible. The region is a hilly area and that is why

the gradient of streams is very steep. As a result, in the main streams the water usually does not freeze. So what we have done is we have diverted the water to a shadow area by constructing a diversion channel with a mild grade. When it reaches the site, the water is released downward of the hill, distributing it in a small quantity so that the velocity can be minimised, and side by side we have constructed ice retaining walls in series to store the frozen water. This is the entire methodology of the artificial glacier,” Wangchuk explains.

These efforts have increased the agricultural production, thereby increasing the income of the locals.

What an amazing idea. As it is rightly said- Necessity is the mother of innovation.

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