

SOLAR SOLUTIONS

How solar-powered water pumps are helping Pakistani farmers adjust to climate change

POSTED BY ALANNA MITCHELL ON JANUARY 19, 2016

One answer to the knotty question of how some of Asia's poorest farmers can adapt to the hardships of climate change may come down to a simple water pump.

But this pump doesn't run on the usual electricity or diesel fuel. Instead, it gets its energy from the sun, allowing farmers to bypass electricity shortages and the high costs of diesel fuel, and, using direct-current solar energy, pump water from depths of about 30 to 60 metres, as long as the sun is shining. "If we can replace diesel-driven pumps with clean energy, that is exciting," says Bashir Ahmad, program leader of climate change and geo-informatics at the Climate Change, Alternate Energy and Water Resources Institute of the National Agricultural Research Centre in Islamabad, Pakistan.

Ahmad's research group recently unveiled an even greater breakthrough for farmers in the Soan River basin, a mid-altitude region of the Hindu Kush range in the western Himalayas. It is a more powerful alternating-current solar pump that not only allows farmers to access groundwater as deep as 91 metres below the surface but also costs half as much as the direct-current solar pump.

The new pump is the result of a partnership with the Himalayan Adaptation, Water and Resilience project (HI-AWARE), one of a quartet of programs in the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA), which is supported by Canada's International Development Research Centre and Britain's Department for International Development. Between them, the two pumps could revolutionize several aspects of farming across large areas of Pakistan and other parts of Asia that are fed by mountain glaciers and the snowpack.

That's important because the Hindu Kush Himalayan region, known as the water tower of Asia, is drying up. A global climate change hot spot, its glaciers, the biggest collection of ice on Earth outside the polar caps, are shrinking as the planet warms.

The results trickle down the mountains and into the flood plains of 10 major Asian river systems, including the Indus, Ganges and Brahmaputra, across eight countries from Afghanistan in the west to Myanmar in the east. Those rivers directly support about 210 million people; their basins help support 1.3 billion people, or nearly a fifth of the world's population. Many are struggling to adapt to rivers that simply don't contain as much water as they once did — or at least not at the times of year they once did.

"The climate change impacts are very high; people are quite poor," says Kallur Subramanyam Murali, who oversees HI-AWARE for the International Development Research Centre in New Delhi, India. "Livelihoods are under immense pressure."



Technicians and farmers watch as an alternating-current solar-powered pump meant to be used with a high-efficiency sprinkler irrigation system is tested at a farm in Talagang, Pakistan, in December 2015. (Photo: HI-AWARE project team/Pakistan Agricultural Research Council)

It will be worse in the future, as climate change continues to shrink the glaciers and destabilize the seasons even more, says Ahmad. Projections suggest that by about the middle of the century, the flow of the mighty Indus River will be reduced by 30 to 40 per cent, he said. Not only that, but rainfall is becoming unreliable.

In the Islamabad region, for example, patterns are dramatically different from two decades ago, Ahmad says. Then, rainfall was uniform; the summer monsoon arrived in the first week of July and left in the second half of September. Now, sometimes the rain stays away for two or three months, which makes it hard to grow food.

In a bid to help, the government of Pakistan had invested heavily in water-efficient irrigation systems using drip or sprinkler methods, but farmers weren't using them because they couldn't afford the non-solar pumping costs.

The HI-AWARE program is trying to come up with solutions to keep food on the table and the solar pumps are an early success. In the next three years, 50,000 hectares of land in Punjab province will be fitted out with high-efficiency irrigation systems. The government of Pakistan has announced that it will provide as many as 30,000 farmers with interest-free loans to buy the alternating-current solar pumps over the same period, with preference given to those who have already installed or are willing to install a high-efficiency irrigation system.

Bernard Cantin, the Ottawa-based program leader of CARIAA, says this is just one of a range of pilot projects on the go, some of which he hopes will eventually give people right across Asia new tools to keep feeding their families.

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READING AS THINKING

Answer the following in complete sentences.

1. Summarize the article. The summary should be concise, clearly identify the main ideas and be in your own words.

2. Explain whether the use of alternating-current solar-powered water pumps is a viable solution for aiding Pakistani farmers in food production.

3. Active reading allows the reader to create images for what is read. It's like a movie playing in your mind.

A) Describe one powerful image from this article.

B) Sketch the image in the box below.

C) Identify the main idea of the article. Is your image connected to the main idea? Why or why not?

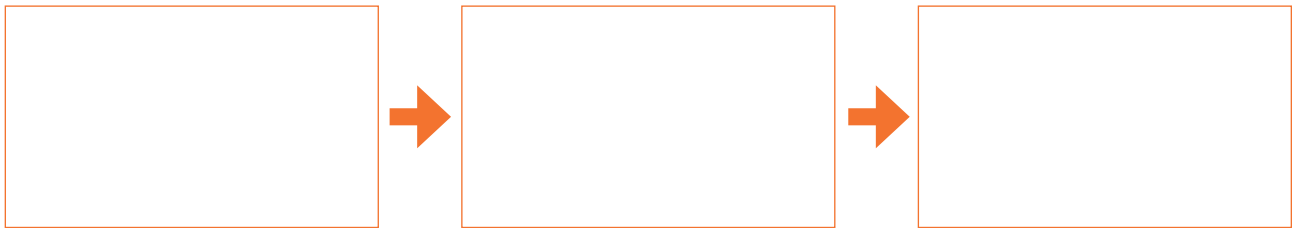
4. Design three insightful questions that you would ask Bashir Ahmad about this project.

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5. A metaphor is a word or description used to imaginatively describe an action or object that it doesn't actually resemble. Create a powerful metaphor for an aspect of climate change.

6. Anticipate the next steps for this project.



7. The International Development Research Centre helps developing countries find solutions to their challenges. What if organizations like it didn't exist?

Think-Pair-Share

8. **Think** Being able to put yourself in the place of others in order to understand their hardships is central to empathy. Reflect on the hardships of struggling farmers in Pakistan due to climate change. Create an encouraging message that provides hope for the farmers. This can be in the form of a quote, motivational poster or tweet. The message should show empathy and promote awareness.

Pair Share the message in a small group. Rework the personal messages of the group into one powerful message.

Share As a class, share and discuss the messages.

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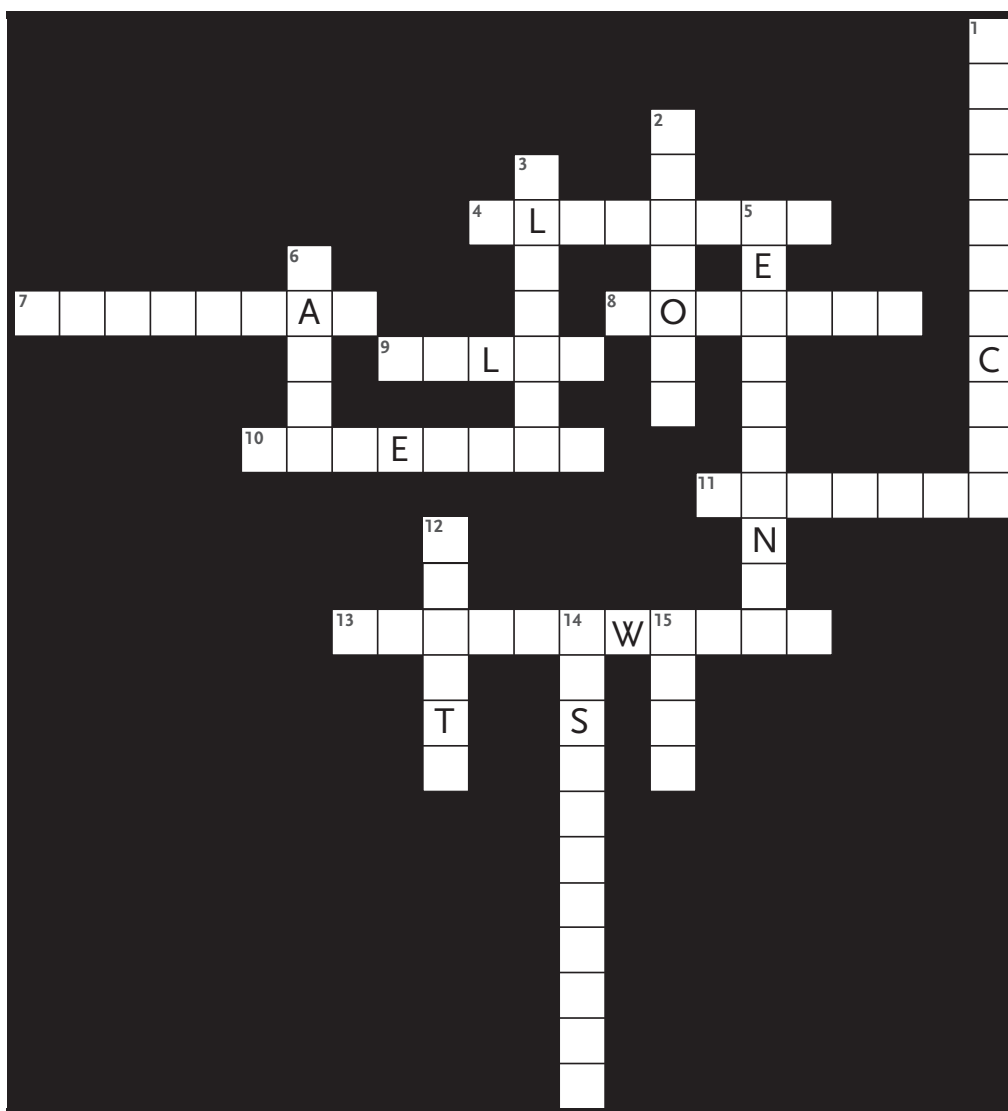
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ONLINE

- To learn more about how climate change is affecting the region, read this [HI-AWARE presentation](#).
- Visit the HI-AWARE website and read the following articles:
 - [Inauguration ceremony for the 'solar-powered AC pumping system for deep tube wells' held in Talagang, Pakistan](#)
 - [Farmers Adapting to Water Shortages in Khaba Baralla, Pakistan](#)
- Watch [Ecosphere: Building resilience in climate change hotspots](#), a video highlighting the work of CARIIA.
- Watch the video [On Thin Ice](#).
- Explore the following on [Google Maps](#):
 - Locate the Himalayas. What countries do they run through?
 - Locate the Indus, Ganges, Brahmaputra and Soan rivers. Follow the routes of these rivers.
 - Find Islamabad, Pakistan.
- Watch the video [Himalayan Meltdown](#).
- Learn [facts about the Himalayas](#).
- Find out more about the [International Development Research Centre](#).

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CROSSWORD:

Across

4. Ice
7. Country in Asia
8. Heavy rains
9. Sun's light
10. Reveal
11. 100 years
13. Water that is found underground

Down

1. Form of energy
2. Consistent
3. Weather conditions
5. Recover
6. River drainage
12. Intricate
14. Unstable
14. Continent