

WORKING WONDERS WITH MINE WASTE

How scientists in Morocco hope to turn huge slag piles of coal mining waste into bricks and transform the city of Jerada in the process



POSTED BY BRIAN OWENS ON AUGUST 24, 2018

The city of Jerada in northeastern Morocco exists because of coal. The city grew up around a major coal mine that opened early last century. But when the mine closed almost 20 years ago, the local economy collapsed and Jerada was left with huge piles of mining waste towering over its centre.

“It’s a very old mine and there were no constraints on environmental waste management, so waste was deposited in the middle of the town,” says [Mostafa Benzaazoua](#), a professor at the Université du Québec en Abitibi-Témiscamingue’s L’Institut de recherche en mines et environnement and a former Canada Research Chair in integrated management of mine waste. When it rains, the piles of waste leach acid into the water table.

The lack of jobs and the environmental pollution has led to social unrest in the region, so the International Development Research Centre has been funding a [project](#) to try and clean up the waste and use it to develop new industries. “The city is very depressed, the population is angry,” says Benzaazoua, who has been working on the project. “We’re trying to lower the pressure.”

Yassine Taha holds a brick that was produced in his lab using coal mining waste from the Moroccan city of Jerada. (Photo: IDRC)

Benzaazoua and his colleague Yassine Taha, a materials scientist at Mohammed VI Polytechnic University in Marrakech who is leading the project in Morocco, hope to do so by using the huge slag piles to produce bricks — a way of removing the waste and creating jobs at the same time. Taha has a personal connection to the project. His father worked in Jerada’s mine for 20 years and died from silicosis after decades of breathing in coal particles. “It’s one of the reasons I started this, he says. “There’s an emotional aspect for me.”

Benzaazoua and Taha looked at the chemical composition of the mine waste and found that it contained the right kinds of materials to make high-quality bricks. But there was one problem — the waste still contained a fair amount of coal residue, which would affect the technical performance of the bricks. So they started by reprocessing the waste to concentrate the coal residue. What was left over was perfect for bricks. They checked for any possible environmental risks from the bricks, or any issues with construction standards, and found none. “It was an amazing result,” says Taha. “The material is comparable to the clays near Montreal that are used in bricks.”

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Additionally, the coal residue that's recovered can be used to produce electricity. And since it's anthracite coal, which burns cleaner than other kinds of coal, its environmental impact is low (at least as far as coal goes).

Taha estimates that the approximately 25 million tonnes of material in the Jerada waste piles could make more than four million bricks. "They are really big reserves," he says, adding that the brick project could have multiple benefits for Jerada and the rest of northeastern Morocco. Producing the bricks will create jobs in a region that has one of the highest unemployment rates in the country; Taha says that when people saw his team working at the waste piles, many came to ask if they were jobs available. The piles also take up a great deal of space in the middle of the city, around 10 to 20 hectares. Using up the piles will free up space for new construction. And currently, the manufacture of bricks requires clay, which comes from agricultural areas. Making bricks from mine waste will help conserve agricultural land, says Taha.

A pile of coal mining waste in the city of Jerada. (Photo: Yassine Taha)

So far, Taha and Benzaazoua have managed to produce bricks in a pilot projects, but they're now looking to go further and develop larger-scale production that could employ between 100 and 200 people. Doing so, however, will require permits from the government to exploit the mine waste, which is a problem because no such permits exist. At least not yet; Taha and Benzaazoua are working with the government to develop the necessary laws that would allow for this type of brick production.

A bigger problem, says Benzaazoua, is finding investors to finance the project. Taha says they have one potential investor interested, and hope to attract more. But some of the very issues that they hope to address are discouraging investors from working in the region. "The social unrest makes it very difficult for investors," he says. "They don't always want to put their money in a place where people are not happy."

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READING AS THINKING

1. Describe some of the negative social and environmental impacts of the mine closure on the community of Jerada.

2. a) Who are Mostafa Benzaazoua and Yassine Taha?

- b) Briefly describe the pilot project they have proposed for the Jerada region.

3. Identify two benefits this project could bring to the Jerada community.

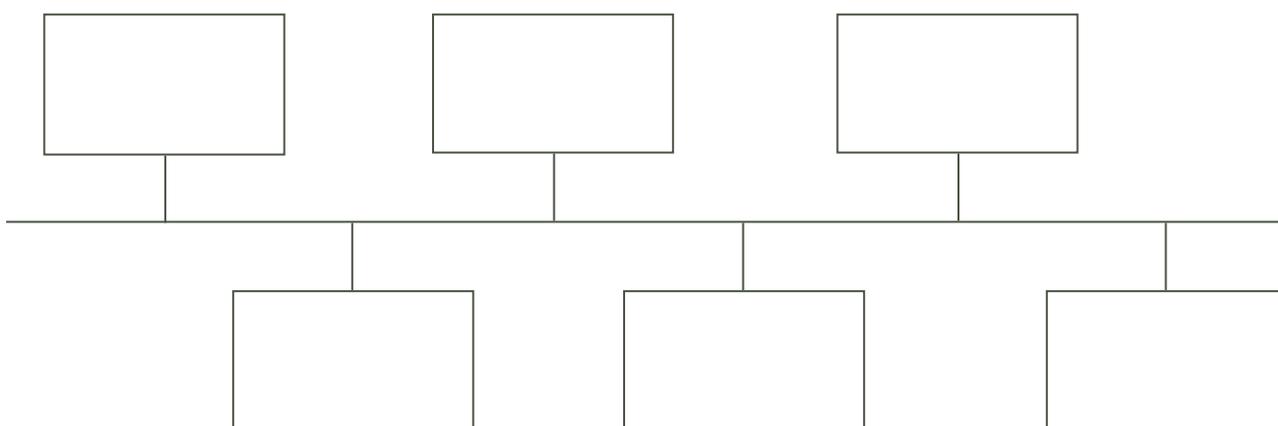
4. Identify two challenges associated with this project

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5. Describe some of the potential impacts that the proposed project, if carried out, would have on the environment.

6. Create a timeline of events from the time the mine closed to the present day, and predict which steps and/or actions Benzaazoua and Taha should take next to make their project a success.



Think-Pair-Share

Think

7. a) Using either a map of Canada, an atlas or an online map, research and identify mining communities within Canada and determine:
- patterns and trends on where these mines are located;
 - what resource is being mined;
 - the location of mining towns in relation to Canada's major cities, ports and trade routes;
 - and which mines have been closed down or are no longer in operation.

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- b) Select one mining town within your province or territory and research how the local mine has impacted the community from a social, environmental, political and economic perspective.

Pair

8. With a partner, compare and contrast the towns and mines you have researched. Next, answer the following questions with respect to both mines:

- a) What do you think will happen to the mines in the future? Are they likely to close?

- b) Could the lifespan of these mines be prolonged if they began operating in a more sustainable or environmentally-friendly way?

Share

9. a) Have students share their mining town with the rest of the class using one of the following platforms.

- i) a classroom map linking all of the highlighted mines
- ii) an Esri Story Map
- iii) the Google Tour Builder
- iv) a presentation method chosen by the student or the teacher

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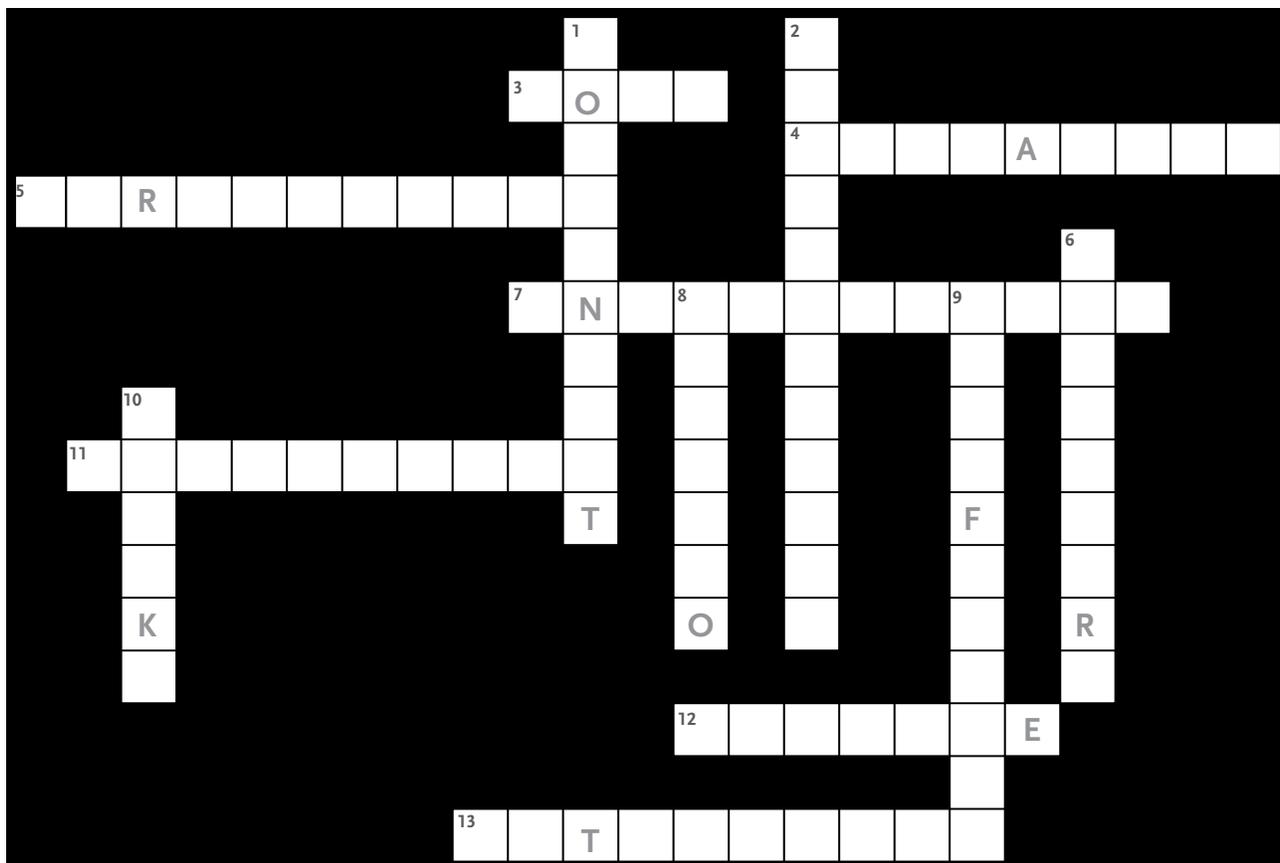
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ONLINE

- Learn more about [natural resources and mining in Canada](#)
- Familiarize yourself with [Indigenous mining agreements](#)
- Use this [interactive map](#) to visualize the locations of minerals and mining in Canada
- Explore different approaches to sustainable mining using the [Mining Association of Canada website](#)
- Find closed mining towns and discuss ghost towns in Canada using the article [Maclean's article about 11 ghost town to see before they're completely gone](#)
- Explore the many resources and activities available at [Mining Matters](#)

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CROSSWORD:

Across

- A type of fuel consisting mainly of carbonized plant material
- The state of the local economy when the mine closed almost 20 years ago
- Making bricks from mine waste will help conserve land devoted to this
- This project will provide jobs which will solve this issue in the Jerada community
- The action of making or manufacturing something
- A small amount of something that remains after the main part is gone
- A type of coal which burns cleaner than other kinds of coal

Down

- Who Benzaazoua and Taha are working with to develop laws
- The lack of jobs has led to this in the Jerada region (2 words)
- What Benzaazoua and Taha need to find in order to finance their product
- The country in which this project is taking place
- To make something on a large scale
- The objects produced from the mine waste