Time to reevaluate agriculture as Cape Town runs dry

BY MOUNIR LOUHAICHI AND KATRIN PARK, OPINION CONTRIBUTOR — 04/28/18 03:00 PM EDT 142

Cape Town's taps are running dry. This South African city of juxtapositions – for some a haven of wine and breathtaking views, for others a city of crushing poverty and the legacy of apartheid – has shown what happens when climate change collides with urban inequality. Here population growth intersects with poor governance. The rest of the developing world will find itself equally parched soon.

By 2100, global temperatures could rise up by 4 degrees Celsius (about 7.2 degrees Fahrenheit). To put that in perspective, the world was a total of 4 to 7 degrees Celsius cooler during the last ice age, when the U.S. was an ice field. Most of the 760 million global poor live on agriculture, so hunger and malnutrition will worsen as they scrape their way through desiccated lands.

In the mid-20th century, history's most famous wheat breeder Norman Borlaug gave farmers high-yielding varieties of wheat and rice to crank out more food. This advancement in agricultural technology known as green revolution averted widespread famine. We need 21st-century science to survive in harsher, drier conditions.

Scientists from the Salk Institute for Biological Studies in San Diego, for example, are breeding plants that can suck in carbon dioxide in the atmosphere and bury it deep in the soil (but it will have to be deployed on a massive scale).

A team at the University of Cape Town is hard at work to find traits from wild plants that can grow with limited water – so-called "resurrection plants" – and use them in food crops, using both conventional breeding and biotechnology. Others are studying metabolism of plants to learn how they use less water during photosynthesis, which enables them to survive during long periods of severe drought.

One such plant is cacti. Originating from the Americas, there are over 2,000 species of them. When all you see is the spiky wild varieties, it's hard to consider them as anything other than bio-fences. But there's a reason the UN calls it a "miracle plant" that can combat desertification. They can survive even if they lose 90 percent of water. They also store water in their pads, providing up to 180 tons of water per 2.5 acres (the size of two football fields), enough to sustain five adult cows.

Cactus pear, also known as prickly pear cactus, can grow in the driest and most degraded land where no other crops will grow. Right now, one fifth of the world's land that is unsuitable for other crops could be used to produce cacti.

This is significant because the plant can reduce soil erosion and enhance soil's capacity to store water, according to scientists at the International Center for Agricultural Research for Dry Areas based out of Lebanon. When planted along contour lines, cactus hedges can double the amount of nitrogen in soil, promoting

plant growth. Countries like Brazil and Tunisia have used cactus pear to successfully conserve soil and water by planting it in vast areas equivalent to the size of Grand Canyon National Park.

Cactus pear can also feed people and animals. They are rich in carbohydrates and minerals and vitamins. The pads can be used as fresh green vegetable and the fruits to make juices and jam. Freshly chopped or sun-dried and ground, it is cheap feed for livestock. Since it is made of 85 percent water, animals don't require additional water.

The farmers of California's bone-dry San Joaquin Valley are growing cactus pear in soils that have become too harsh for other conventional crops. They own cultivar patents and plan to produce juice and powder plants. In Pakistan and India, scientists are conducting on-farm demonstrations to showcase the multiple uses of cactus pear.

In Mexico, where the government heavily subsidized it as an alternative to dry beans and corns in the 1970s and 1980s, consumption of cactus pear has reached 14 pounds per person annually. Today, it's the sixth fruit crop, after orange, avocado, banana, mango and apple.

Agriculture consumes the majority of water (80 percent in the United States). While farmers can choose to adapt drought-tolerant plants or new technology to manage water and enrich soil, meaningful change has to come through policy.

Obviously, one plant cannot be the answer to climate change. Cape Town might be grappling with a three-year drought. But for poor Capetonians, water has always been a rare commodity long before the current crisis.

Megacities like Jakarta, Mexico City and Sao Paulo are not far off. In Jakarta, the city's poorest residents on the marginal land must contend with higher risk of flooding and poorer quality water because the rich neighborhoods use power pumps to draw deep groundwater, making the ground to sink. Addressing water crisis means addressing inequality as well.

Cactus pear will also be useless in below-freezing temperature or in the tropical areas where cyclones wreak havoc. Eventually, climate change will make large areas of agricultural production unusable, and farmers will have to find alternative livelihoods with or without cactus pear.

But right now in poor rural areas of the developing world, plants like cactus pear save lives. In Ethiopia's Tigray region, near the Eritrean border, where the majority of population rely on agriculture, it is a crucial source of food and animal feed.

Cactus pear has a long way to go before becoming a commercial crop in the era of climate change. The main challenge is perception. It was only in the 1980s that scientists began studying the benefits of this plant. Globally, only a handful of agricultural universities list cacti in curriculum. Few government officials are aware of it, let alone know the techniques to manage it. But cactus pear production has proved profitable, despite poor markets and lack of promotion. With investments, a thriving cactus pear agro-industry could benefit producers at all levels.

More droughts are coming. And unless cities learn the lessons from Cape Town's crisis, we'll continue to see what happens when they meet bad policies.

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