
EXPERT COMMENTARY

The future of sustainability lies in our ability to address agricultural resilience, adapting to and mitigating the impact of climate change while securing and enhancing essential food, water and land resources, says Instar's [Gregory Smith](#)



Growing resilience through agricultural infra

Following two years of unprecedented disruption, from a global pandemic to raging forest fires, it is more certain than ever before: the world is undergoing radical change. Our population continues to grow at a rapid rate, estimated by the World Bank to reach over 10 billion by 2050, a trend that exacerbates already pressing challenges, including urbanisation, resource scarcity and climate change.

With existing infrastructure barely keeping pace with current levels of demand and maintenance requirements, successfully achieving a more sustainable future necessitates a long-term approach prioritising both preventative

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and restorative action to address climate change as well as nature loss.

When it comes to sustainability, discussions often centre around the idea of reducing our environmental footprint, focusing on specific monitoring and initiatives like reducing corporate emissions.

While the ability to operate and exist without further damaging natural resources is important to future-proofing our communities and mitigating further environmental

deterioration, it is only a fraction of a much larger equation.

We must move away from purely reactive strategies in response to the wave of environmental effects playing out around the world and towards a concept of resilience that equips our infrastructure to withstand changes, whether those be trends in population, environmental factors or technological advancements.

As Jamais Cascio, a renowned futurist and thought leader on the intersection of environmental, technological and cultural change, said: "Sustainability is about survival. The goal of resilience is to thrive."



Energy efficiency in action

In 2020, Saskatchewan announced a project to irrigate up to 500,000 acres of land from Lake Diefenbaker, more than doubling the irrigable land in the Canadian province.

Proposing a 10-year construction process with a budget of around C\$4 billion, these irrigation projects are an investment in environmental and socioeconomic development within the province. Over 50 years, the projects are predicted to result in a C\$40 billion to C\$80 billion increase in gross domestic product, and the creation of 25,000 construction jobs by the start of operations.

Within agricultural infrastructure – a sector accounting for 40 percent of emissions in the US, 70 percent of water use globally and responsible for feeding our communities – the concept of ‘resilience’ allows us the opportunity to reduce environmental impact and frame new solutions for longevity, helping our communities to adapt and flourish in an evolving landscape. Innovation, technological advancements and new investment in the sector offer a unique pathway to rethinking and reimagining our relationship with the natural environment around us.

More than this, agricultural infrastructure investment addresses the very human impact of our current landscape:

water scarcity, food waste and land pollution. Ultimately, resilient agricultural infrastructure is necessary for communities to thrive, grow and prosper.

Thirst for change

By 2050, the Organisation for Economic Co-operation and Development anticipates that nearly 40 percent of the world’s projected population will be subject to severe water stress. Today, the United Nations reports that 80 percent of countries, both developed and developing, are already failing to find sufficient funding for national drinking water and sanitation requirements.

As a sector, agricultural infrastructure arguably plays the largest role in our efforts to secure the world’s freshwater supply. According to the World Bank, agriculture currently accounts for 70 percent of all freshwater withdrawals globally and an even higher share of consumptive water use, making this sector the largest factor in our communities’ ability to thrive. Addressing the basic human need for water as populations increase necessarily requires improvements to these existing systems, including enhancing monitoring technologies, modernising irrigation, and increasing efficiency and productivity.

More broadly, meeting the demand for clean potable water without depleting existing aquifers necessitates better management of water supply and new approaches to water distribution across industries. By implementing innovative approaches, enhancing efficiency and monitoring, we can make the most of our current supplies of this limited natural resource.

While some jurisdictions in the US report losing between 30 percent and 40 percent of water from source to destination, according to the country’s Environmental Protection Agency, innovative solutions such as smart meters and real-time identification of leaks can save up to 75 percent of water loss, allowing for earlier issue identification and maintenance.

One person’s trash

As the global population continues to rise, food waste is placing an increasing strain on our essential infrastructure and natural resources. Despite food shortages and decreasing available land, landfills in the US continue to brim with food waste products, taking up around 18 percent of the nation’s arable crop land and 21 percent of all freshwater according to ReFED, a US non-profit dedicated to ending food loss and waste.

The agricultural and energy infrastructure sectors, which closely intersect, have an opportunity to adapt to



Embracing adaptability

The Rialto Bioenergy Facility in Southern California began construction in 2018 with the aim of providing an efficient, local energy solution through the diversion of 300,000 tons of organic waste each year.

Once operational, the facility will be the largest food waste diversion and energy recovery facility in North America, taking 700 tons of food waste and 300 tons of biosolids each day and converting them into renewable energy and organic fertiliser.

On an annual basis, the Rialto facility alone will be responsible for producing 13MW of energy while reducing approximately 220,000 metric tons of carbon dioxide.

this reality and reframe the current ‘waste problem’ as a reliable, clean energy solution.

By using food and animal waste, which contribute to about 6 percent of global greenhouse gas emissions, bio-energy repurposes what is frequently written off as undesirable. Instead, it creates a source of value: delivering green energy, opening up usable land and connecting farmers to a previously untapped resource.

Incorporating waste-to-energy and anaerobic digestion facilities within existing agricultural operations has the potential to mitigate further damage to the environment while generating new economic opportunities. Such innovative changes will assist in making our agricultural infrastructure – and communities – truly resilient.

Forest for the trees

Efficient land use, including the rehabilitation of the natural environment and reforestation efforts, is fundamental to a sustainable future. In the last three decades alone, the World Bank estimates a global loss of 1.3 million square kilometres of forested area, more than the entire country of South Africa. At the same time, reports in recent years have stressed the importance of trees and forested areas to our long-term health, with benefits ranging from removing carbon dioxide from the air, helping to decontaminate water, supporting local wildlife and biodiversity, to a spectrum of physical and mental health advantages that arise from human proximity to trees.

Furthermore, forestry management and reforestation are among the most important solutions to addressing the effects of climate change. Serving as ‘natural infrastructure’, trees play an integral role in the carbon cycle. The European Environment Agency reports that one mature tree can clean almost 22 kg of carbon dioxide from the atmosphere every year.

Notably, new technological developments and research enables us to not



Using trees to restore sustainability

In 1999, the West Virginia Department of Environmental Protection approved the US state’s first bioremediation project using trees to decontaminate high levels of petroleum compounds in the soil and groundwater at Cabin Creek.

Over the course of seven years, the project successfully reduced the levels of gasoline by 82 percent for soil and 59 percent for water, and levels of toluene by 90 percent for soil and 84 percent for water.

Significantly, this project showed an effective alternative to traditional remediation – which would typically require an investment of around \$65 million – for \$220,000, less than 1 percent of the cost.

only reduce the current human impact on the environment, but to restore land and bodies of water that have been polluted. Bioremediation, the use of specific plants to remove toxins in contaminated soil or water, is an exciting development towards such efforts and an extension of the critical role trees play in balancing our environment.

It is a slower, but considerably more cost-effective, approach that can be further improved with time, capital and technological advancements. With investment, we can rehabilitate, reclaim and restore the finite resource of land, which is crucial to long-term stability and growth as our population increases and climate change impacts our natural landscape.

Building for resilience

Ultimately, our survival and ability to progress as a society will come down to

the resilience of our agricultural infrastructure, which directly informs our ability to support, grow and protect the essential human needs within our communities.

As we witness changes in our environment and the undeniable impact of climate change, it is clear that the time for action is now.

We must push past our current understanding of sustainable operations to proactively reclaim our natural resources by staunching water loss, preserving land, reducing emissions arising from food waste and reforesting our woodlands and communities. Simply put, in the words of German entrepreneur Jochen Zeitz: “Sustainability is no longer about doing less harm. It’s about doing more good.” ■

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