



**Flooding linked to sea-level rise could displace hundreds of millions of people on the world's coasts and cause trillions of dollars in annual losses by mid-century. With the development of nature-based solutions, adaptive infrastructure, and advancing monitoring, we can protect people, improve well-being, and restore coastal environments.**

## **Building Coastal Resilience**

Coastal regions are home to nearly 40 percent of the world's population, generate a major share of global economic activity, and provide food, jobs, and protection for billions of people, but these areas are increasingly vulnerable.

Ensuring healthy coastal ecosystems is vital to any coordinated response to climate change, but impacts are accelerating faster than traditional coastal approaches can adapt. As an MIT Climate Project frontier – a priority area for coordinated, cross-MIT action to deliver unique impact at scale – the effort to build coastal resilience focuses on reducing risk and strengthening long-term well-being in these regions.

We envision working with coastal communities through a combined approach that safeguards coastlines, restores biodiversity, protects enduring carbon sinks, and stimulates sustainable economic growth. By advancing climate-positive blue economies, communities can lead regenerative projects that reduce climate hazards and build prosperity. Our goal is to strengthen coastal resilience in ways that protect people and ecosystems together. That means integrating science, engineering, design, and policy; shifting from reactive recovery to proactive planning; and using sensing, modeling, and data to guide investments. And because every coastline is different, this work must be local.



### **Support our work to build coastal resilience**

We seek endowed and expendable support to help fund projects that promote the health of the planet's shores and accelerate high-potential ideas from research into real-world impact.

## THE POWER OF HEALTHY SHORELINES

Living coastal systems – such as marshes, mangroves, reefs, and beaches – are powerful tools for both adaptation and mitigation. They store up to five times more carbon per hectare than tropical forests, can cut flood risk by up to half, reduce wave energy by up to 70%, and support biodiversity. If protected and restored, coastal ecosystems could sequester or avoid as much as a billion metric tons of carbon dioxide annually by 2050, generating \$10-\$20 billion per year in carbon credits for local communities and creating new economic opportunities tied to stewardship and resilience. Moreover, each dollar invested in mitigation efforts saves several more in post-disaster recovery and, most importantly, saves lives. The opportunity now is to turn this proven potential into deployable solutions that communities can adopt at scale.

### The Role for MIT

MIT's distinctive contribution is the ability to integrate physical science, engineering, design, and social systems and connect them through shared infrastructure and partnerships. The result is adaptive approaches that fortify our shorelines and reduce flooding and erosion – and help to secure the lives and livelihoods of coastal communities. By linking prediction and planning with design and deployment, MIT scientists can help coastal communities reduce risk and restore ecosystems more quickly and efficiently than siloed approaches allow.

Areas to explore include:

- **Creating new bioeconomies** that shift production from land to sea and enable coastal communities to prosper.
- **Developing sustainable aquaculture** to generate feedstock, maximize food production, create high-value materials, and promote healthy ecosystems.
- **Creating measurement, monitoring, reporting, and verification tools** for coastal carbon dioxide removal and carbon markets.
- **Developing novel, distributed, or low-cost sensors** to monitor and manage extreme weather and climate risks.
- **Designing nature-based coastal hybrid infrastructure** to provide adaptive, cost-effective protection.
- **Innovating financing mechanisms** to fund community climate resilience.
- **Empowering community-driven leadership** to ensure that strategies are locally relevant, just, and enduring.

## COASTAL REALITIES



**~40%**

**of the world's population lives within 200 km of a coastline**



**\$1 trillion**

**in estimated annual losses by 2050 due to storms, erosion, and loss of natural buffers**



**\$6–14**

**saved in post-disaster recovery spending for every \$1 spent on mitigation**



**1 gigaton**

**of CO<sub>2</sub>e per year could be mitigated by resilient coastal ecosystems**



### Learn More

Scan this QR code with your phone's camera  
[betterworld.mit.edu/climate-and-energy](https://betterworld.mit.edu/climate-and-energy)