

Global warming may require higher dams, stilts

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FILE- In this file photo taken Monday, June 23, 2008, floodwater from the Mississippi River surrounds a small shed behind a house in Foley, Mo. With the world losing the battle against global warming so far, experts say humans need to do what nature does: Adapt or die. (AP Photo/Jeff Roberson, File)

(AP) -- With the world losing the battle against global warming so far, experts are warning that humans need to follow nature's example: Adapt or die.

That means elevating buildings, making taller and stronger dams and seawalls, rerouting water systems, restricting certain developments, changing farming practices and ultimately moving people, plants and animals out of harm's way.

Adapting to rising seas and higher temperatures is expected to be a big

topic at the U.N. climate-change talks in Copenhagen next week, along with the projected cost - hundreds of billions of dollars, much of it going to countries that cannot afford it.

That adaptation will be a major focus is remarkable in itself. Until the past couple of years, experts avoided talking about adjusting to global warming for fear of sounding fatalistic or causing countries to back off efforts to reduce emissions.

"It's something that's been neglected, hasn't been talked about and it's something the world will have to do," said Rajendra Pachauri, chairman of the Intergovernmental Panel on Climate Change. "Adaptation is going to be absolutely crucial for some societies."

Some biologists point to how nature has handled the changing climate. The rare Adonis blue butterfly of Britain looked as if it was going to disappear because it couldn't fly far and global warming was making its habitat unbearable. To biologists' surprise, it evolved longer thoraxes and wings, allowing it to fly farther to cooler locales.

"Society needs to be changing as much as wildlife is changing," said Texas A&M biologist Camille Parmesan, an expert on how species change with [global warming](#).

One difficulty is that climate change is happening rapidly.

"Adaptation will be particularly challenging because the rate of change is escalating and is moving outside the range to which society has adapted in the past" when more natural climate changes happened, U.S. National Oceanic and Atmospheric Administration chief Jane Lubchenco, a marine biologist, told Congress on Wednesday.

Cities, states and countries are scrambling to adapt or are at least talking

about it and setting aside money for it. Some examples:

- England is strengthening the Thames River flood control barrier at a cost of around half a billion dollars.
- The Netherlands is making its crucial flood control system stronger.
- California is redesigning the gates that move water around the agriculturally vital Sacramento River Delta so that they can work when the sea level rises dramatically there.
- Boston elevated a sewage treatment plant to keep it from being flooded when sea level rises. New York City is looking at similar maneuvers for water plants.
- Chicago has a program to promote rooftop vegetation and reflective roofs that absorb less heat. That could keep the temperature down and ease heat waves.
- Engineers are installing "thermal siphons" along the oil pipeline in Alaska, which is built on permafrost that is thawing, to draw heat away from the ground.
- Researchers are uprooting moisture-loving trees along British Columbia's coastal rainforests and dropping their seedlings in the dry ponderosa pine forests of Idaho, where they are more likely to survive.
- Singapore plans to cut its flood-prone areas in half by 2011 by widening and deepening drains and canals and completing a \$226 million [dam](#) at the mouth of the city's main river.
- In Thailand, there are large-scale efforts to protect places from rising sea levels. Monks at one temple outside Bangkok had to raise the floor by more than 3 feet.

- Desperately poor Bangladesh is spending more than \$50 million on adaptation. It is trying to fend off the sea with flood control and buildings on stilts.

President Barack Obama and Congress are talking about \$1.2 billion a year from the U.S. for international climate aid, which includes adaptation. The U.N. climate chief, Yvo de Boer, said \$10 billion to \$12 billion a year is needed from developed countries through 2012 to "kick-start" things. Then it will get even more expensive.

The World Bank estimates adaptation costs will total \$75 billion to \$100 billion a year over the next 40 years. The International Institute for Environment and Development, a London think tank, says that number is too low.

It may even be \$200 billion a year or \$300 billion a year, said Chris Hope, a business school professor at the University of Cambridge and part of the IIED study.

Nevertheless, Hope said failing to adapt would be even more expensive - perhaps \$6 trillion a year on average over the next 200 years. Adaptation could cut that by about \$2 trillion a year, he said.

As much as three-quarters of the spending will be needed in the developing world, experts say.

"Those are not the countries that caused the problem," Hope said.

"There's a pretty strong moral case for us giving them assistance for the impacts that we've largely caused."

Sending money from rich countries to poor ones raises questions of who will control the spending and whether it will be wasted or stolen.

As for helping plants and animals, British climate scientist Martin Parry said the world will have to create a triage system to figure out which living things can be saved, which can't and are effectively goners, and

which don't need immediate help.

"It's a brutal way to go about things," Parry said.

And what about people?

Some islands, such as the Maldives, and some coastal cities will not be able to survive rising seas no matter what protections are put in place, said Saleemel Huq, a senior fellow at IIED who runs an adaptation center in Bangladesh. In those cases, he said, the world will need "planned relocation" of people and cities.

Parmesan said people are going to have to realize that "some areas are not going to be good enough to live in in the next 100 years."

On the Net:

International Institute for Environment and Development report on costs of adaptation: tinyurl.com/iiedadapt

United Nations [climate change](http://unfccc.int/adaptation/items/4159.php) convention adaptation site: unfccc.int/adaptation/items/4159.php

U.S. National Oceanic and Atmospheric Administration adaptation site: tinyurl.com/noaadapt

California adaptation strategy: www.climatechange.ca.gov/adaptation/

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