

Hey tigerprincess89,  
Leaving the past behind isn't all bad.



Claim your name @ AOL Mail.

Spring **SALE!**  
Save 20% Storewide Some exclusions apply.

NATIONAL GEOGRAPHIC STORE **SHOP NOW**



Inspiring people to care about the planet since 1888 | [Learn More »](#)

[Sign In](#) SUBSCRIPTIONS

Site  Video

Connect With Us

Newsletters >>

HOME VIDEO PHOTOGRAPHY ANIMALS ENVIRONMENT TRAVEL ADVENTURE NATGEOTV KIDS

Shop Daily News | Science | Education | Games | Events | Blogs | Movies | Explorers | Mobile | Our Trips

# NATIONAL GEOGRAPHIC Daily News



[Home](#) [Animals](#) [Ancient](#) [Energy](#) [Environment](#) [Travel/Cultures](#) [Space/Tech](#) [Water](#) [Weird](#) [News Photos](#) [News Video](#) [News Blogs](#)

## Scientists Race to Save World's Rice Bowl From Climate Change

More frequent floods and droughts expected in Southeast Asia.



Swells rise into a rice field in Dhal Char, Bangladesh, making it hard to cultivate. Climate change may make such events more frequent and severe.

Photograph by Peter Essick, National Geographic

### Share

Comments (0)

Tweet < 60

Email

Ker Than  
For National Geographic News  
Published May 2, 2012

*This story is part of a special National Geographic News series on global water issues.*

Climate change is predicted to cause more intense and frequent floods and droughts in Southeast Asia, threatening the world's rice bowl and millions of people who live there unless preventive actions are taken soon, scientists warn.

### The World's Water

The world's increasing population and development of agricultural land are putting pressure on the Earth's limited freshwater supplies. Find out what's at stake and how you can help.



#### Why Should You Care?

Learn more about the world's water challenge with photos, stories, videos, and more.



#### Visualizing Our Water Footprint

You might be surprised to see how the daily choices you make affect critical watersheds around the world.

[Learn More About Freshwater »](#)

ADVERTISEMENT

Hey tigerprincess89,  
Leaving the past behind isn't all bad.

Claim your name @ AOL Mail.

[More »](#)

## News Video



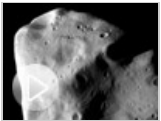
[Shuttle Discovery: Final Flight Over D.C.](#)



[Baboons Can Learn Words?](#)



[Tornado Crosses Kansas Highway](#)



[Watch: Asteroid Seen Up Close](#)



[Cameron Completes Solo Dive](#)

[See All News Video »](#)

At the Climate Smart Agriculture in Asia workshop held in Bangkok, Thailand, last month, climatologists and agricultural researchers discussed farming practices and technologies that could help the region cope with global warming's effects, including rising temperatures, increased salinity, and sporadic rainfall.

The conference was about "bringing all these players together to look at how the research agenda needs to change in the agricultural research world in relation to climate change," said Bruce Campbell of the Consultative Group on International Agricultural Research (CGIAR), which helped organize the two-day workshop.

In addition, scientists at the meeting discussed potential ways to use agriculture to mitigate the effects of climate change by reducing greenhouse gas emissions such as methane. Agriculture, forestry, and changes in land use account for a third of greenhouse gas emissions, said Campbell, who is the program director of CGIAR's Research Program on Climate Change, Agriculture and Food Security (CCAFS).

"That's a significant portion," Campbell said, "but we can reduce it."

(Related: "[See the Global Water Footprint of Everyday Crops](#)")

### Breaking the Breadbasket?

The countries of South and Southeast Asia are home to more than 30 percent of the world's population, about half of whom depend on agriculture—mainly rice, but also other crops such as wheat—for their livelihoods. But according to the World Bank, global warming could reduce agricultural productivity in the region by 10 to 50 percent in the next 30 years.

Some changes are apparent already. For instance, steadily rising sea levels have already led to an increase in the salinity of the water in Vietnam's Mekong Delta, where the Mekong River empties into the South China Sea. This has forced some people in the region to abandon rice production and shift to shrimp farming.

"In a way, they're prospering from the change because they make more money raising shrimp than from rice," said [Matthew McCartney](#), a hydrologist with the CGIAR [International Water Management Institute](#), who attended the workshop. "But not everybody has the capability to do that. Some people are adapting, but others are losing out as a consequence of sea level rise."

According to the United Nations Food and Agriculture Organization (FAO), rising sea levels will increase salinity in the soils of rice-growing areas in deltas and flood plains of other major rivers in Asia, including the [Ganges](#), the [Yangtze](#), and the [Yellow](#) Rivers.

In the long term, such changes could force Asian countries to shift their rice farms to other locations, similar to how some wineries in Australia have moved to lower—and cooler—areas to counter the harmful effects of global warming on their grapes.

"In Asia, there's the possibility that you're really going to have to think more about radical transformations in order to adapt, as the shift from rice to shrimp illustrates," Campbell said.

(Related: "[Artificial Crops Water Glaciers in Indian Highlands](#)")

### Recharging Aquifers

But in other circumstances adaptation can be incremental, and require only a gradual shifting of farming systems. One such solution discussed at the Bangkok workshop was using Managed Aquifer Recharge (MAR) technology in the region. MAR involves using land in upstream areas of major rivers to capture and store floodwater in natural underground aquifers, and then pump it out during dry spells for farmers to use.

"The idea is to set aside land where you know the soil conditions and geology will allow water to infiltrate very quickly into the ground and pump it out later for irrigation," McCartney explained.

MAR has been used for water storage in arid areas such as Australia and Southern Europe, but not in relatively wet regions that get regular rainfall such as Southeast Asia, he added.



## Clean Water for All

A National Geographic News series on the world's water crisis

[Read the series »](#)

## Water Currents, by Sandra Postel and Others



### Protecting Rivers From Dams

New solutions are needed for ecosystems and livelihoods.



### \$35 Pump Changes Lives

Treadle pumps allow poor farmers to grow more.

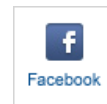


### In Search of Alligator Snapping Turtles

The bizarre-looking reptiles often indicate ecosystem health.

[More Posts »](#)

## Connect With Nat Geo



## Stories From Experts in the Field



### Why We Shouldn't Dam the Mekong

National Geographic Fellow Zeb Hogan tells us what needs to happen in order to save the region's giant fish.



### Rainwater Harvesting in India

Sunita Narain tells us how one remote village is setting an example for the rest of the country—and world.

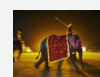


### Boston Water Conservation

National Geographic Freshwater Fellow Sandra Postel describes one of the biggest success stories in urban water management.

[Read More Stories »](#)

## SPECIAL AD SECTION



### TRAVEL MARKETPLACE

Check out new travel destinations and plan your next trip! >>

But the use of MAR in the region makes sense, because it could simultaneously solve two major problems that scientists foresee affecting the region. First, it would create a backup source of water that farmers could draw from in times of drought. It could also lessen damage from floods by diverting water from swollen rivers.

"In Thailand, it could have had a major impact in reducing the flooding [last year] in Bangkok," McCartney said. The floods caused \$40 billion in damage.

Early calculations indicate that about 40 square miles (100 square kilometers) of recharge basins could irrigate more than 770 square miles (2,000 square kilometers) of farmland. Rather than establishing one large recharge basin, the idea is to create lots of smaller basins in suitable locations across the landscape.

"You could quite easily make up the loss of production in the land that you've set aside for the recharge basin," McCartney said.

Juliet Christian-Smith, a senior researcher at the Pacific Institute in Oakland, California, agreed that groundwater storage technologies such as MAR could provide useful buffers against the increased variability in rainfall that climate models predict.

"There are a lot of positives associated with storing water underground," Christian-Smith said. "We usually think of our water supply as coming from surface water such as snowmelt and rivers, but in fact . . . much of the water that supports irrigation and our global food supply comes from groundwater and in many cases it is being depleted faster than it is being recharged, leaving room for underground storage."

Because it stores water underground, MAR isn't vulnerable to some of the problems that plague dams, she added. For example, climate simulations predict that many parts of the Earth will experience warmer temperatures, which will in turn increase evaporation rates at dams. "There's also problems with sedimentation, because if you have more flooding, you could have more subsidence and erosion," she said. "That means your dam life and the amount of water it can store is reduced."

CGIAR's McCartney said MAR use in Southeast Asia is still only at the idea stage. "It hasn't gone beyond people thinking about it," he said. "There would need to be quite a lot more research done."

One question that will need to be resolved, Christian-Smith said, is what impact recharge has on water quality. A recent study in Bangladesh, for example, indicates that repeated injection of water into underground aquifers could leach arsenic and other toxic chemicals from the ground and concentrate it in the water supply.

(Related: ["Megafishes of the Mekong"](#))

#### A Novel Solution for Water and Climate

Attendees at the Bangkok workshop also discussed ways to help farmers not only deal with climate change locally, but actually lessen its global impact by reducing the amount of greenhouse gases their crops produce.

One promising technology for doing this is called rice alternative wetting and drying. As the name implies, it involves alternately flooding and drying rice fields to reduce the amount of methane produced. Normally, farmers leave their rice fields submerged for the entire growing season, but this generates methane, a potent greenhouse gas. By drying the fields periodically, scientists at the International Rice Research Institute have shown that water consumption could be slashed by 30 percent and greenhouse gas emissions reduced by 25 to 50 percent, without reducing yields.

"This is a fantastic technology for water savings and greenhouse gas emission savings," Campbell said. "Rice is so important across the whole of Asia that if one could implement this technology in many different places, you could have significant reduction in methane production."

But as with MAR, the details of this technology will have to be worked out before it can be widely implemented. For example, Campbell said, farmers must put much more effort into water management; at the moment there are no incentives to encourage them to do so. In other cases, large numbers of farmers would have to coordinate their flooding and drying cycles for it to be most effective.

#### Long-Term Management

While promising technologies, neither MAR nor rice drying will be enough to



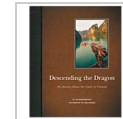
#### GREAT ENERGY CHALLENGE

Visit the GEC hub today and learn how you can participate in the global energy conversation.

### Shop National Geographic



"238 Black Hills National Forest - Southeast Trail Map"  
\$11.95



"Descending the Dragon"  
~~\$21.95~~ \$14.95

[SHOP NOW >](#)

### Great Energy Challenge Blog

[New Survey of Undiscovered Oil Shows Shift Away from Middle East, Russia](#)

[The Heat Goes On: CO2 Reaches Another High-Water Mark](#)

[Delta Buys Oil Refinery; Should Others Follow?](#)

[Wind Farms, Climate Change Connection Lukewarm At Best](#)

[The 1 Percent's Electric Car: The \\$980,000 Rimac Concept\\_One](#)



resolve all of the agricultural problems that scientists predict will accompany climate change, experts say.

"To mitigate negative effects of climate-induced floods and drought require the application of integrated management concepts that have been developed in the past years and are now increasingly applied," said Wolfgang Grabs, a hydrologist with the United Nations World Meteorological Organization, a co-sponsor of the Bangkok workshop.

"These include both structural and non-structural methods," Grabs said, "such as dykes and levees, land use planning, storage facilities for water, improved forecasting and management of water resources, as well as suitable climate change adaptation approaches."


CGIAR's Campbell agreed. "I don't think there's going to be a silver bullet," he said. "You're going to have to do many different things."

 (0)


 Tweet  60  More »




## Latest News




Supermoon Coming Saturday



Photos: 24 New Lizards Found




Scientists Race to Save Rice Bowl




British Columbia Rethinks Carbon Tax


## More From National Geographic




2012 Traveler Photo Contest




Download the Nat Geo Today iPad App




Everest 2012




Photos: The Unseen *Titanic*




Your Texas Photos



Why the Mariana Trench Is So Deep



11 Rivers Forced Underground

 [National Geographic Home](#) » [News](#) » [Scientists Race to Save World's Rice Bowl From Climate Change](#)

[HOME](#) [VIDEO](#) [PHOTOGRAPHY](#) [ANIMALS](#) [ENVIRONMENT](#) [TRAVEL](#) [ADVENTURE](#) [NATGEOTV](#) [KIDS](#) [SHOP](#)

[Daily News](#) | [The Magazine](#) | [Maps](#) | [Science & Space](#) | [Education](#) | [Games](#) | [Green Living](#) | [Events](#) | [Blogs](#) | [Movies](#) | [Explorers](#) | [Mobile](#) | [Site Index](#)  
[Subscriptions](#) | [Buy Prints](#) | [Stock Footage](#) | [Stock Photos](#) | [Our Trips](#) | [Newsletters](#) | [Jobs](#) | [Global Sites](#) | [Sustainability](#) | [About](#) | [Contact](#)  
[Gifts](#) | [DVD's](#) | [Books](#) | [Maps & Globes](#) | [Sale](#) | [Travel Gear](#) | [Photography Gear](#)  
[Donate](#) | [Press Room](#) | [Customer Service](#) | [Advertise With Us](#) | [Terms of Service](#) | [Privacy Policy](#)



© 1996-2012 National Geographic Society. All rights reserved.

