

# Rapid climate change threatens Asia's Rice Bowl

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As Asia's monsoon season begins, leading climate specialists and agricultural scientists warned today that rapid climate change and its potential to intensify droughts and floods could threaten Asia's rice production and pose a significant threat to millions of people across the region.

"Climate change endangers crop and livestock yields and the health of fisheries and forests at the very same time that surging populations worldwide are placing new demands on food production," said Bruce Campbell of the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). "These clashing trends challenge us to transform our agriculture systems so they can sustainably deliver the food required to meet our nutritional needs and support economic development, despite rapidly shifting growing conditions."

Southeast Asia recently has experienced dramatic meteorological swings, as last year's horrendous flooding in Thailand was preceded by a record drought across the region in 2010. These and many other extreme weather events around the world have hammered [global food prices](#), stretching their impact beyond immediate personal and ecological tragedies.

In Thailand, a drought during the 2010 growing season caused \$450 million in crop damages. One year later, [massive flooding](#) in 2011 caused \$40 billion in damages that rippled through all sectors of Thailand's economy.

"In the fields, there is no debate whether climate change is happening or not," said Raj Paroda of the Asia-Pacific Association of Agricultural [Research Institutions](#) (APAARI). "Now, we must think about what the research community can provide governments to guide effective action. Given the region's current state of [food insecurity](#), climate-smart agriculture has to become the central part of Asia's adaptation strategy."

South and Southeast Asia are home to more than one-third of the world's population and half of the world's poor and malnourished. Absent new approaches to food production, climate change in this region is expected to reduce agriculture productivity by as much as 50 percent in the next three decades. And with agriculture serving as the backbone of most economies in the region, such plunging yields would shake countries to the core.

Also, farmers are being pressed to focus not just on coping with climate change but also on mitigating the impact of agriculture on greenhouse gas emissions. Farming, along with forestry and land use change, accounts for almost one third of greenhouse gas emissions globally.

In response, it is imperative that agriculture simultaneously become more productive, more resilient and more climate-friendly, according to participants at a [conference on climate smart agriculture in Asia](#) taking place this week in Bangkok. The conference is being convened by APAARI, CCAFS, the World Meteorological Organization (WMO) and the United Nations Development Programme (UNDP).

"Meeting this challenge will require more than age-old approaches centered on collecting as much water as possible, such as simply building large dams," said Matthew McCartney of the International Water Management Institute (IWMI).

Most Asian countries became food self-sufficient in the 1970s and

1980s as a result of investments made during the Green Revolution that ushered in new varieties of rice and other crops, wider irrigation and better water and crop management. Today, the mega-deltas of Asia's major rivers are the rice bowls for the world and are crucial to meeting global grain demand.

But now, the growing variability between seasons has increased pressures on water supplies, while at the same time rising sea levels are tainting freshwater supplies with high levels of salinity. This troublesome combination is putting Asia's tremendous [rice production](#) at risk. Rice in Asia is grown in vast low-lying deltas and coastal areas such as the Mekong River delta, which produces more than half of Vietnam's rice; the rise in sea level from climate change will change the hydrology and salinity of these fields. Moreover, some of the major river basins—including the Chao Phraya in Thailand and the Red in Vietnam—are considered "closed" because all of the water flow has been claimed.

In South Asia, the Ganges and Indus river basins underpin the food security of well over a billion people. Yet danger signs are looming: 88 percent of Indians live in river basins with some form of water scarcity or food deficit. In [Southeast Asia](#), despite the wider use of irrigation, approximately 75 percent of crops are still rain-fed and remain especially vulnerable to the vagaries of the climate.

## **Searching for Creative Ways to Manage Extremes**

For Thailand, managing the agricultural challenges presented by climate change means planning to handle both too much water and too little. In one solution, known as "Managed Aquifer Recharge" (MAR), land in upstream areas of major rivers is set aside to "capture" floodwater and direct it into natural underground aquifers. With fully "charged" aquifers, farmers could then maintain rice yields during dry spells.

Accompanied with new rice varieties that can tolerate dryer conditions these climate-smart technologies deliver practical ways to help farmers cope with climate change and in turn feed the world.

Current flood preparations revolve around adjusting water levels of dams on the Chao Phraya. After the 2010 [droughts](#), water levels were kept higher to make more water accessible to farmers during drier times. But this in turn limited the ability of the dams to accommodate the record monsoons that took place only a year later. Experts are looking now to MAR systems as a way to help farmers ride out the dry side of climate extremes without creating problems when the pendulum swings back in the opposite direction.

In India, MAR is already being implemented on a broad scale to replenish groundwater supplies that have been drained by farmers, a problem many blame on the availability of cheap, subsidized diesel fuel for powering irrigations pumps.

Crop production is not the only aspect of agriculture that needs to adapt. Livestock production systems, especially in developing countries, are changing rapidly in response to population growth, urbanization and the growing demand for meat and milk. But current livestock production methods, for example, average about 900 liters of water just to create one liter of milk, according to Purvi Mehta-Bhatt, head of the International Livestock Research Institute's (ILRI's) Asia region.

"It is important to consider livestock's impact on climate change," Mehta-Bhatt said, "But you also need to consider climate change's impact on livestock, such as heat stress and the migration of Bluetongue disease and other illnesses."

In looking at the most extreme examples of [climate change](#), Mannava V.K. Sivakumar of the World Meteorological Organization highlighted

the increase in size, frequency and economic impact of [extreme weather events](#).

"We can see that the losses associated with climatic risks are increasing," Sivakumar said. "But much of the loss is not insured, meaning that most of the populations of developing countries have to pay the price for these disasters and our changing climate."

Provided by Burness Communications

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