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Global climate change: Permaculture works with, not against, ecosystems

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The climate is trying to tell us something. From one of the worst droughts in Texas history, stoking unprecedented wildfires, to record precipitation in the Midwest, fueling historic flooding along the Mississippi River, to Portland's second wettest and third coldest spring on record that's delayed the growing season, extreme weather events have gotten our attention in the past year.

And although consensus is growing on the threats that global climate change pose -- from loss of habitat for tundra wildlife to crop failures the world over -- we hear few voices of reason on what to do about it. But from Oregon to West Africa, the fields of innovative farmers are abundant and more resilient than conventional fields from techniques that work with, rather than against, ecosystems -- sometimes referred to as permaculture. They're demonstrating that we can act through choices we make at the dinner table.

Average temperatures in the Pacific Northwest have varied significantly over the past century, with a 1.5 degree F overall increase since 1920. Decreased snowpack in the Cascades is expected in the coming decades, as well as decreased summer rainfall -- making less water available for agriculture. According to the Oregon Global Warming Commission, flooding will increase in some areas, while drought will increase in others. Unpredictable, inconsistent and extreme weather can wreak havoc on crops.

Worldwide, recent record-breaking climate events have shocked the world's food systems. In Russia, last summer was the hottest ever recorded and the driest in 40 years -- triggering hundreds of wildfires, damaging one-third of the country's wheat harvest and causing global food price spikes. Simultaneously, heavy monsoons brought the worst flooding ever recorded in Pakistan, destroying 2.4 million hectares of cultivated land. Severe flooding covering an area twice the size of France took a massive toll on Australian agriculture, and drought in the Amazon brought the Rio Negro -- a major tributary to the Amazon River -- to its lowest level ever recorded, affecting the yields of farmers and fishermen.

Climate changes directly affect food production, but agriculture is also among the biggest contributors to greenhouse gas emissions (GHGs). Livestock production and forest-clearing for farmland contribute high levels of carbon dioxide, nitrous oxide and methane, which are potent GHGs. At each step of our food system -- from farming to processing, packaging, transportation, consumption and the production of fertilizers and pesticides -- GHGs are

released. The global food system is responsible for as much as one-third of GHGs.

Permaculture farming practices are lightening the impact that our meals have on climate change, reducing our dependence on fossil fuels, and keeping Oregonians and Malians alike nourished as shifting climates stress our food systems.

Over the past two years, Worldwatch Institute's Nourishing the Planet team traveled to 25 countries across sub-Saharan Africa in search of success stories in sustainable farming. The team's findings, highlighted in the "State of the World 2011: Innovations that Nourish the Planet" report, include farmer-led innovations that are helping communities adapt to, and mitigate the effects of, climate change.

In the Sahel -- at the southern fringe of the Sahara Desert in western Africa -- for example, farmers are using rotational tree farming that prevents erosion by wind and rain and also stores carbon in the soil. This technique also preserves soil moisture, a useful adaptation in the Sahel. The region is expected to experience drier conditions in the coming decades, and the food system's resilience to these changes will be vital for the impoverished communities that depend on it.

In the American Midwest, Mark Shepard of New Forest Farm in Wisconsin says he's adapting to the increased precipitation in the region with savvy farming. By planting a wide range of crops and omitting chemical fertilizers, his farm's soils are healthier and have the capacity to hold more water. New Forest Farm thrives with cherries, apricots, kiwis, olives, asparagus, apples and more, while conventional farms remain vulnerable to flooding and soil erosion.

The Urban Farm Collective, based in Portland, is establishing community-centered, productive food gardens in backyards and vacant lots in the city. The sustainable "urban farms" improve access to locally grown healthy food, helping improve the resilience of Portland's food supply. The collective also raises awareness about sustainable urban farming through workshops and classes.

Farmers in Oregon and across the world are not only learning to cope with climate fluctuations, they are also demonstrating the positive role food systems can and should play in reducing GHGs. If we are to continue to feed the planet -- and feed it well -- then we must rethink the industrial food system. We can start with what is on our own plates.

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