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Inside Climate News

Science

By Cell Phone, Scientists Assist African Farmers Facing Effects of Climate Change

By Jeanne Roberts
November 27, 2009

For much of the last 200 years, levels of atmospheric carbon dioxide hovered around 275 parts per million. In this century, with atmospheric carbon dioxide nearing 390 ppm, and climbing annually by about 2.5 ppm, we are already beyond what many scientists see as a critical threshold in climate change.

Farmers around the world are already feeling the impact.

In India, the worst monsoon season since 1972 threatens the 60 percent of cropland that relies on rain; many fields weren't even planted this year. In China, a drought that started in the north in the spring (leading some to suggest moving the capital, Beijing) now extends to the central and southern portions of the nation, and is being touted as the worst in 40 years.

The same situation is repeating itself in the Middle East, with serious impacts in Iraq, parts of Turkey, Jordan and Syria as the Tigris and Euphrates rivers run dry. The Aral Sea, tapped to grow Russian cotton

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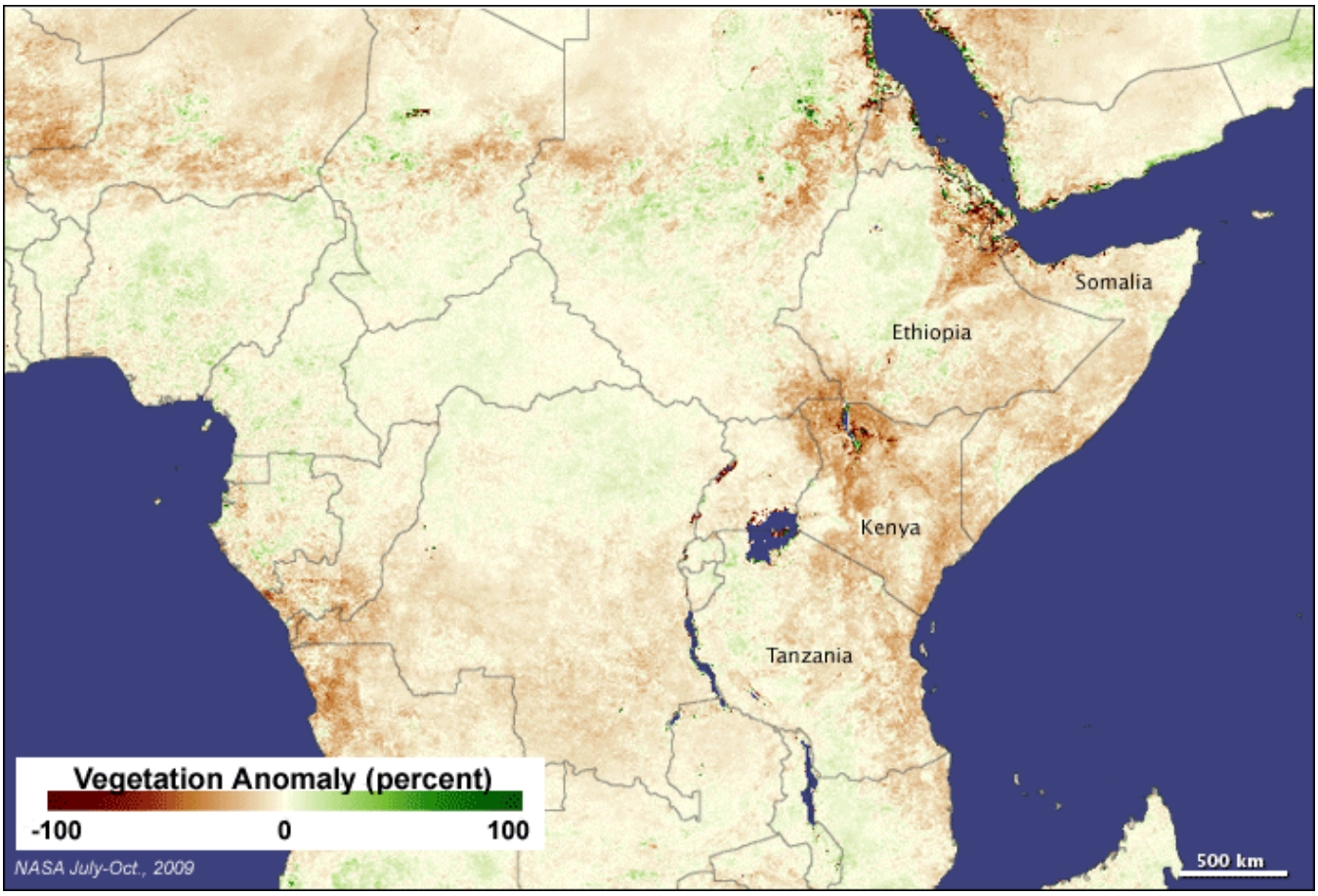
In Africa, nations like Ethiopia, Somalia and Kenya are experiencing severe drought. Where once the rains failed every nine or 10 years, they now fail every two to three years. In Kenya's Kamba region, where many crops have withered, residents live on a meagre government dole and try to dig wells, but a subsurface rock layer stymies them. Dying livestock add to the turmoil, forcing cattle raids within and across borders that further threaten the stability of governments and facilitate the work of rebels, who leave behind their own trail of dead and dying.

According to James Hurrell of the U.S. National Centre for Atmospheric Research and Martin Hoerling of the U.S. National Oceanic and Atmospheric Administration (NOAA), these droughts, which are part of a cyclic pattern and likely to intensify, are directly related to excessive greenhouse gas emissions.

The United Nations Climate Change Conference at Copenhagen in December doesn't look like an answer; too few of the major greenhouse gas-emitting nations are willing to slash emissions for fear it will hurt their economies.

That leaves farmers in many countries struggling to adapt. To help, some dedicated scientists and researchers in Africa are using technology, specifically cell phones, in an effort to ensure the crops planted will best meet the challenges of climate change.

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One project, the Weather Info for All Initiative, will install up to 5,000 Automatic Weather Stations at wireless network sites across Africa.

The joint effort by the UN World Meteorological Organisation, the Global Humanitarian Forum and the Earth Institute at Columbia University is aided by telecoms Ericcson and Zain. It will collect, analyze and disseminate site-specific weather forecasts and early warnings to rural African farmers, fisherman and livestock handlers, presumably via SMS, or texting.

The information is valuable, but there's a problem with texting. Senior Program Specialist Edith Adera of the Canadian-based International Development Research Centre (IDRS) notes that older, rural Africans are not particularly comfortable with SMS, since theirs is an oral-based culture and they consider the method somewhat rude and impersonal.

In fact, a free service providing agronomic information via SMS saw only a 30-percent uptake. Subscribers preferred to talk to a live human, even if it meant calling them back. This was true even though M-PESA,

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essentially impersonal nature. Still, it's clear that rural Africans prefer their oral culture, talking in the marketplace and to friends and co-workers, over texting.

There have been 653 different initiatives on ICTs (Information and Communication Technologies) and small-scale agricultural information in Africa over the last 18 years, and Adera has participated in many of them.

Successes are evident, failures equally so, largely due to technology constraints and the fact that information does not flow evenly uphill and down; that is, from meteorologists to agricultural ministries, and from there to the farmer, who also contributes his (or her) input back to the weathermen and ministries.

An example of the former comes from Boston University professor Anthony Patt of the International Institute for Applied Systems. He cites RANET, which failed because the radio stations were the weak link, presumably failing to deliver time-sensitive information when needed or in a format that appealed to rural agrarian audiences.

The same might be true for television in Kenya, where the service is limited, devices are spread thinly, and the medium itself is used primarily for entertainment and politics.



The lesson: Many of the agronomic information services are destined to fail if the medium does not provide an appropriate platform to deliver the message to the audience that needs it.

In spite of the apparent failures, Adera sees agronomic information delivered by cell phone as having great promise in Africa. Her

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Kenyans in particular, are buying mobile phones at a record rate, rising 55 percent in just the past five years.

> "In fact, depending on how the service is offered, and the culture within the community, and their level of technological comfort, I would say that the use of cell phones has one of the highest potentials of new ICTs, including e-mail and the Internet, for delivering timely agronomic information, largely because of this oral tradition," Adera said.

Patt concurs, and his former work — which in 2005 involved using knowledge of El Nino effects to predict optimal crop planting — showed that farmers readily availed themselves of information when it was provided in a format they were comfortable with. They planted drought-resistant crops when the prediction of drought was available.

> "At that time, the idea of disseminating information by cell phone was not really an option, but of course it is a great idea," he said.

Patt observed that farmers who used seasonal climate forecasts did in fact enjoy higher yields as a result.

> "Interestingly, the effect was most pronounced in years where relatively good rains were predicted, because this allowed farmers to take advantage of the opportunity,

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and plant higher yielding crops, which, of course, require more rain," he said.

"Farmers were also much more likely — about five times as likely — to use the seasonal climate forecasts to influence their management practices, when the information reached them in a participatory manner, such as in a workshop, compared to over the radio. The workshop format allowed them to ask questions, and really understand how the information could be applied to their own management practices. However, it did appear that once farmers had grown accustomed to using the forecasts, they were more likely to trust and use the broadcast version."

The IDRS had a similar program, which was evaluated both for long-term accuracy in weather forecasting and for farmers' comfort levels with various means of distribution — paper, radio, television, CD Rom, e-mail and the Internet. Not surprisingly, Adera notes, rural farmers had to reach a technological level of comfort, starting with paper, radio and television.

Eventually, such programs as cybercafes, called "digital villages" in Kenya, where farmers could use e-mail knowing that an expert was at the other end of the line to answer their questions, also saw rural African farmers gradually reaching a higher level of comfort with new technologies.

The caveat, Adera says, is understanding what type of information is

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> “When you introduce an intervention, you have to be very aware what their current economic activities are, and what the predominate agricultural practice is. That is, what do they grow and where do they sell it. Then you need to evaluate their current sources of information against informational needs.
>
> "Farmers generally require information about what to grow, how to grow, when to grow, and how to deal with pests and diseases. This information must take them through the entire cropping cycle, from seed to sale. Where people are accepting of the value of information, based on past experience, they are sometimes willing to pay more if the information helps improve yields.”

For Africa, then, and perhaps for most of the world where agriculture represents stability, having affordable, manageable, comprehensible systems of agronomic information dissemination can make the difference between failed crops and a sustainable agrarian economy adapted to local weather conditions.

Adera sums it up:

> “Of late, weather and climate is beginning to get very critical. It is no longer behaving in

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> forecasts to improve their decision making, that would be critical to survival."

The convergence between old and new technologies (i.e., calling into a crop-based radio program, using a cell phone to interact), promises the best hope that African farmers will plant crops that survive changing rainfall patterns. But this also implies a caveat; that cell phone service providers and agronomic information providers deliver product at rates affordable to struggling farmers, and not at the premium rates presently established.

This should be manageable, Adera says:

> "Affordable, appropriate, IT investment is critical to combat the effects of climate change. However, with 60 percent or more having these devices, you're not really spending that much money, just putting applications in place that allow farmers to access needed information."

The conclusion is evident; emergency food aid in the short-term is essential to keep people from starving. In the long-term, however, real help will come in the form of charitable institutions coordinating with telecom companies to deliver geographically intensive, affordable communications platforms. This is the best weapon against climate change and starvation, in Africa and elsewhere.

See also:

Africa's Agriculture Vulnerable to Breakdown Under Climate Change

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