



## Adapting to a Changing Climate

Climate change is going to require adaptation and innovation from all of us, with those in the farming industry bearing the brunt of that change. With scientists developing new technologies and ideas, people around the world will have to work with scientists to put these technologies and ideas into practice for the sake of the planet and humanity.



**0:12**

*Clips of scenic natural sights; clip of weather changes on a map; clips of various effects of weather-related events*

It will take years—even decades—to develop the innovations we'll need to reach net zero emissions by 2050.

In the meantime, we'll have to find ways to adapt to the effects of climate change that are already happening. Of course, depending on your circumstances, what will be required to adapt may be quite different. Some will need to find ways to withstand severe storms and flooding while others will need to endure droughts, water shortages, or wildfires.

Whatever weather-related events each of us confront, having to adapt to climate change is something we all will share. Most of us have probably experienced some consequence of climate change already. Unfortunately, the frequency and severity of these events will get worse.

**1:11**

*Bill Gates appears on screen; clips of dry and barren crops; clip of insects eating plants*

When erratic weather strikes or when extreme temperatures occur, it can be devastating.

When you're a farmer, however, you are particularly dependent on the weather: warmer air temperatures cause the soil to lose moisture, making it harder to grow crops. Plant eating insects will migrate to new areas that never had to contend with them before. Cows and sheep will eat less and produce less milk.

Worldwide, about 2/3 of people in poverty work in agriculture. Many own farms that are less than 4 acres of land. These smallholder farms are valuable sources of food for both families and communities.

**2:02**

*Clips of farming in various developing countries; farmer preparing local dish; clip of CGIAR logo*

There are over 500 million of them around the globe, largely in developing countries and climate change will have a disproportional impact on them. If these farms are to continue to be productive and thrive, then farmers are going to have to find ways to adapt to more volatile conditions.

The ability to grow food as weather conditions change is something we all depend on, but for smallholder farms the stakes are especially high: if a crop fails, the result can be much more than just losing food and income, it could mean losing a way of life.

An organization whose mission is to help ensure that farmers can better adapt to the effects of climate change is a Consultative Group for International Agriculture Research (or One CGIAR, as it's now known).

**3:00**

*Photos of farmers globally; Loboguerrero appears on screen with textbox showing her name*

Founded in 1971 to bring together various international research centers, One CGIAR's primary focus is addressing food security issues.

Ana Maria Loboguerrero is research director for CGIAR.

LOBOGUERRERO: Some of the main challenges that small holders have right now it's really being able to make small decisions, such as, when to plant, when to apply the water, when to apply the fertilizers.

But what has been happening in the past decades is that it is really hard to know when you'll have this climate variability in terms of, for instance, not having rainfall or having too much or high temperatures.

**3:56***Clips of dry and flooded crops*

So these extremes are the ones that have been changing a lot and therefore for farmers it's really hard to understand and to know what's the best decision in terms of how to manage their crops.

Basically, what we do is to work together with a variety of stakeholders to really being able to transform food, land, and water systems under a climate crisis. So what we do is research. But not only research, we make sure that our research is benefiting millions of stakeholders in food systems around the world.

**4:44***Clips of maize crops, farmers working with maize, a family enjoying maize*

Of all the projects One CGIAR has initiated for adapting to climate change, their work on developing drought tolerant and stress tolerant maize, or corn, are among the most significant. Maize is one of the most important cereals around the world.

Just to give you an idea of the magnitude of this, 1.2 billion people in sub saharan Africa and Latin America consume maize and it's one of the most important sources of food in their plates. Also, it provides 30% of the calorie uptake of these households. It's also used to feed animals.

Drought was one of the most important things that was decreasing the productivity of maize in many countries.

**5:43***Clip of cracked soil at a dry farm; clips of thriving maize crops*

So this was a long-term project in terms of funding, in terms of capacity building, which is very important, and in terms of providing the right incentive so that the farmers would use the varieties that were developed by the CGIAR.

At the end of the day, we ended up with more than 200 new maize varieties that were resilient to drought and that benefited around 48 million African people.

Through the techniques that we are using to develop these varieties, we are considering in our research issues such as, for instance, local cooking characteristics.

**6:34***Clips of African cooking techniques*

Because you can have the best variety that responds really well to droughts, but then, if it doesn't taste the way that farmers are used to, farmers are not going to use it. So it's not convincing them to use them, it's very much doing the research and coming up with these varieties in a way that we are considering those social factors into our research and therefore into the product that we are delivering.

So it is not anymore the scientist by himself, by herself, working in the laboratory, coming up with these brilliant ideas. That has not worked. We really need to understand how these ideas are tailored to specificities on the ground.

**7:33***Andrews appears on screen with textbox showing her name; textbox showing definition of Coastal carbon capture*

How do they relate with social variables and with the social dimension in general.

Grace Andrews is the director of scientific operations for Project Vesta.

ANDREWS: Project Vesta is an organization that is fundamentally committed to helping people thrive in the face of the climate crisis and we are doing that by developing a negative emission technology called Coastal Carbon Capture, which actively removes carbon dioxide from the atmosphere and moves it into the ocean in a safe and stable form. Fundamental scientific principle that underpins Coastal Carbon Capture is something called chemical weathering, which is a natural process that happens all the time all around us.

**8:27***Clips of Scientists working in labs*

So it happens in your backyard, every time water comes into contact with rocks. So every time it rains it happens, every time you water your lawn this is happening, and this is removing carbon dioxide from the atmosphere.

This process of chemical weathering is the process that has regulated Earth's atmospheric CO<sub>2</sub> levels on geologic time scales anyway, um, so for billions of years. And this process, although very effective at controlling atmospheric carbon dioxide levels, is relatively slow. So what Project Vesta is trying to do is simply accelerate this process so that it happens a little bit more quickly and is useful for mitigating climate change.

**9:15***Clips of natural olivine rocks*

To reach this goal, Project Vesta is hoping to use a substance called "Olivine," which gets its name from its pale green color. The idea of using Olivine to remove carbon dioxide from the atmosphere has been around for about 20 years. Olivine is a mineral. It is a naturally forming mineral that is incredibly common, it's found just about everywhere.

Unlike most minerals, it has a very special property to it that when it comes into contact with carbon dioxide and water it chemically reacts, it dissolves very slowly, and that chemical reaction transfers carbon dioxide from the atmosphere into the water and by that way removes carbon dioxide from the atmosphere and helps to mitigate climate change.

**10:08***Clip of the Sun setting; clip of Andrews looking out at the ocean*

You know, we are doing this because we care about planet Earth and about humanity. You know, as a scientist, I have confidence that we can develop the technologies to remove carbon dioxide from the atmosphere or to limit carbon emissions to the atmosphere.

So it's not a question of if we can do it, but whether we want to do it as a society. You know, we can invent the technology but unless people want us to deploy it, want us to be working with them, then all the technology in the world doesn't do us any good.



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