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Pack 115

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**Farmer strategies for adapting to climate change in Ethiopia**

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Notes to broadcaster

Adapting to climate change is a major challenge for African nations, including Ethiopia. Like other countries, Ethiopia is developing and implementing plans for adapting to the changing climate. But in order to develop effective adaptation policies, Ethiopia needs better information on how its climate will change and the risks that presents. Currently, there is little guidance on what practices farmers can use to best adapt to the climate changes they will experience.

To help address these gaps in knowledge, a German organization called the Potsdam Institute for Climate Impact Research conducted a thorough scientific assessment of how the Ethiopian climate is likely to change over the next several decades. Their assessment generated information on how the climate might change and the impacts of those changes on farmers.

As well as studying how the Ethiopian climate is expected to change, the study also studied what farming practices Ethiopian farmers can offer the best potential to adapt to future changes in climate.

This script is a fictionalized conversation between two radio hosts. Host 2 introduces the scientific study from Potsdam. Host 1 asks questions about what the study discovered, and Host 2 responds. The two hosts discuss what the scientific study predicts about how the Ethiopian climate will change. They also describe the kinds of farming practices with the best potential to help Ethiopia farmers adapt to the changing climate.

You could also use this script as a foundation for creating your own program on climate change and how farmers in your area can best adapt to it. Here are some ways to share this information so that your listeners can understand it and act on the information they hear:

* You could invite a climate and / or agricultural scientist to discuss the study’s predictions of climate change and what impacts they will have on Ethiopian farmers.
* You could invite an agricultural expert to explain one or more of the practices recommended by the scientific study and why it has so much potential, and then answer questions on how farmers can best implement the practices.

Estimated running time for the script: 20 minutes, with intro and outro music.

**HOST 1:** Good morning, listeners

**HOST 2:** Yes, good morning, everyone. You have all heard of climate change, right?

**HOST 1:** (LAUGHTER) Of course they have! The changing climate is an everyday reality for farmers in Ethiopia. They see unpredictable rainy seasons, long dry seasons, and extreme weather like floods and droughts much more often.

**HOST 2:** Yes, that’s right. Well, with that in mind, today we are going to talk about some farming methods that can help Ethiopian farmers adapt to the changing weather. A German organization called the Potsdam Institute for Climate Impact Research conducted some scientific research that asked two questions: First, how is the Ethiopian climate likely to change over the next 30 years? And second, how can Ethiopian farmers change their farming practices to best adapt to the new weather patterns while at the same time ensuring they have enough food and enough income to support their families?

**HOST 1:** That sounds like a very necessary thing to study. So let’s start right in. You said they looked at how the weather will change. What impact will climate change have on the weather in Ethiopia over the next 30 years?

**HOST 2:** There will be changes in a number of areas, including temperature, the availability of water, the amount and the distribution of rainfall, and the number of extreme weather events. The changing climate will also change crop yields, and it will affect how suitable particular areas are for growing particular crops.

**HOST 1:** That is a lot of change. But let’s start with temperature. How will the temperatures in Ethiopia change over the next 30 years?

**HOST 2:** Climate scientists predict that temperatures in Ethiopia will rise about one degree by 2050. They also say that the number of very hot days and hot nights per year is expected to increase.

**HOST 1:** One degree doesn’t sound like very much. I don’t think most people would notice if the temperature rose by one degree. Will it make any real difference to farmers?

**HOST 2:** Surprisingly, one degree can make a great deal of difference. One extra degree of heat could, for example, reduce yields of many crops, though not all crops will be affected in the same way.

**HOST 1:** That *is* a surprise.

Ok, so it sounds like by 2050, the weather will generally be hotter and we’ll have more days and nights with extreme heat. You mentioned the availability of water. That’s very important for all farmers. How will that change?

I know we’re going rather quickly through this information, but we have a lot of important information to cover!

**HOST 2:** River flow in the Blue Nile and other major Ethiopian rivers is predicted to increase, reflecting a longer rainy season.

We know that the climate very strongly influences crop production in Ethiopia. This means that the increased heat and the longer rainy season will have a big impact on whether various areas of the country are suitable for growing different crops.

What the scientists found is that, generally speaking, over the next 30 years, many areas in Ethiopia will be less suitable for growing maize, wheat, and teff. But some areas will become more suitable for growing sorghum. Also, over the next 30 years, maize yields will increase slightly in Ethiopia as a whole, but will fall in certain areas.

**HOST 1:** In which areas will maize yields fall?

**HOST 2:** Maize yields are expected to fall in parts of Dire Dawa, Gambela, Somali, Oromia and SNNP, particularly in pastoralist areas.

**HOST 1:** Ok. So the hotter weather and longer rainy season will change crop yields, including for maize. Maize production will rise in some areas, but fall in others. Is that right?

**HOST 2:** Correct.

**HOST 1:** Good. You mentioned that the scientific study looked at what kinds of practices farmers can use to adapt to these changes in the climate. Did the scientists identify any particular practices that can help farmers adapt and stay food secure?

**HOST 2:** Well, there are lots of potential ways that farmers could change their farming practices to try to adapt to the new climate. But the scientists identified four kinds of practices that look particularly promising for Ethiopian farmers. The two practices with the most potential are agroforestry and improvements to fodder and feed. But in addition, irrigation and improved crop management are also promising ways to adapt. I should add one other point: When farmers use combinations of these strategies, they will likely be more successful.

**HOST 1:** You mean, for example, like adopting both agroforestry practices and irrigation? Or improvements to fodder and feed and irrigation?

**HOST 2:** Exactly.

**HOST 1:** Ok. So let’s start with agroforestry. First, what do you mean by “agroforestry”?

**HOST 2:** Agroforestry involves interactions in the farmer’s field between agricultural crops and trees. Ethiopian farmers already use various kinds of agroforestry practices. I’ll mention three kinds of agroforestry used in Ethiopia. First, some farmers have home gardens that include trees. Second, some farmers have multi-story coffee systems. In multi-story coffee systems, trees provide fruit, timber, and fodder. They improve soil fertility and provide shade for mid-level crops like coffee and enset. Vegetables and medicinal herbs are grown on the forest floor. Third, some Ethiopian farmers grow multi-purpose trees in their fields.

**HOST 1:** What are multi-purpose trees?

**HOST 21:** Multi-purpose trees are simply trees that provide several different types of benefits. I’ll give you some examples *Acacia nilotica* is used for fuelwood, beverages, and as a windbreak. *Lucaena leucocephala* can be used for fuelwood, and also for poles, timber, and fodder. *Grevillea robusta* is used fortimber, fuelwood, and building materials. And *Azadirachta indica,* or neem, can be used for timber, firewood, for making manure, for essential oils, and to make pesticides. So the three different sorts of agroforestry already commonly used in Ethiopia are home gardens with trees, multi-story coffee systems, and multi-purpose trees in farmers’ fields.

**HOST 1:** Ok, I have heard of these kinds of agroforestry. But what are the benefits? How can agroforestry help farmers adapt to climate change and stay food secure?

**HOST 2:** In many ways. Trees provide shade for crops, and this shade lowers the temperature of the soil, which allows it to retain more moisture. Trees also increase soil fertility when their leaves fall and act as mulch or as a source of nitrogen. This is especially true for nitrogen-rich, leguminous trees like C*alliandra calothyrsus* and *Sesbania sesban*. Trees can also reduce pest and disease problems. Trees can stabilize soils and fight soil erosion, especially for farmers those who grow on steep slopes. In these ways and more, trees can help farmers reduce the risk from rising temperatures and unpredictable rains.

**HOST 1:** But wouldn’t trees that shaded maize reduce its yield?

**HOST 2:** The answer to that question depends on what part of the Ethiopia you live in. In some parts of the country—such as some zones in Dire Dawa, Gambela, Somali, Oromia and SNNP, maize yields are expected to fall by 2050 with climate change. In these areas, using trees to provide shade can actually maintain maize yields. But in areas where maize yields are not expected to fall with climate change, you’re right—shade might not provide as much benefit.

**HOST 1:** Can you give me a practical example of how a farmer could use agroforestry to adapt to climate change?

**HOST 2:** Sure. Let’s say a farmer has two acres of maize. If the farmer planted a certain number of mango trees in the maize fields, the maize yields would be better than with maize alone—because of all the benefits the trees provide. Also, the farmer would be able to both eat and sell mangoes, which would improve family nutrition and boost and diversify income.

**HOST 1:** But what about the cost of purchasing mango seedlings? The farmer would have to remove some maize plants to make space for the mango trees, right?

**HOST 2:** Yes, these costs would decrease the farmer’s income for the first few years. But by the third or fourth year and from then onwards, the farmer who plants mango trees in a maize field could earn considerably more than by only growing maize.

**HOST 1:** Ok, we’ve talked about agroforestry. You said that improved fodder and feed was another approach that could help Ethiopian farmers adapt to climate change over the next 30 years. What kinds of improvements to feed and fodder are you talking about?

**HOST 2:** I’m talking about ways to, for example, improve the nutritional quality of fodder and feed, to improve its digestibility, and to improve the quantity and availability.

**HOST 1:** Ok. Please give me some practical examples.

**HOST 2:** Sure. A number of strategies have already been successful in Ethiopia. For example, some farmers have planted improved, high-yielding varieties of forage. These include Napier grass, desho, oats, and Rhodes grass. Other farmers have intercropped grasses and cereals with legumes such as native Desmodium, alfalfa, cowpea, or vetch. Or they have created irrigated fodder banks. Or they’ve improved natural pastures by removing invasive weeds. By improving fodder and feed in these ways and others, farmers can increase livestock production and income and adapt to climate change.

**HOST 1:** Are there any particular promising practices?

**HOST 2:** One that seems particularly promising and cost-effective is Napier grass. Napier grass needs a lot of water, so it must be irrigated. A recent experiment in Amhara showed that growing irrigated Napier grass could double milk yields and substantially increase farmers’ income.

**HOST 1:** Double milk yield? How?

**HOST 2:** Because it would substantially increase the quantity of feed—as well as the quality. Farmers would need to make an initial investment in Napier grass, but that investment would pay off after only three years.

**HOST 1:** Are there any challenges?

**HOST 2:** It may be easier to introduce this kind of practice in some areas than others, such as lowland pastoralist and agro-pastoralist regions of Ethiopia.

Also, farmers who want to adopt any kind of farming improvement face some common challenges. For example, they might lack financial resources or have poor access to markets. Or they may not be able to access training and information.

**HOST 1:** Ok. We’ve talked a little about agroforestry and improvements to feed and fodder. These were the two kinds of farming practices the scientists said had the greatest potential to help Ethiopian farmers adapt to the changing climate in the next 30 years. But you said there were a few other kinds of practices that were also promising, especially when used in combination. Please tell me a little bit about those practices.

**HOST 2:** Two other practices that showed promise are irrigation and improved crop management.Let’s start with irrigation.Using irrigation allows farmers to adapt to higher temperatures and erratic or insufficient rainfall by increasing production. It can allow them to produce during the dry season, and it can also provide supplementary wáter during dry periods in the rainy season. Irrigated dry-season crops can fetch more money, and irrigation can also help farmers grow higher-value crops such as fruits and vegetables.

**HOST 1:** Will irrigation work well everywhere in Ethiopia?

**HOST 2:** What the scientists said is that, irrigation is a good strategy in areas where the cost of installing and maintaining irrigation is relatively low and where enough water is available.

There is actually enough water in Ethiopia to irrigate millions of acres by using tools and mechanisms like water pumps, gravity systems, pressure, and accessing underground water or harvesting rainwater.

**HOST 1:** Ok.What about improved crop management?

**HOST 2:** Improved crop management covers a lot of different things. But some of the most promising ways to manage crops more effectively are planting improved seeds, using fertilizer, and changing planting dates. Improved seeds often give higher yields and have fewer pest and disease problems. By using various types of fertilizers, farmers can increase the amount of organic carbon in the soil. In areas with degraded soils, improving the amount of soil organic carbon can make it possible to plant crops such as maize, wheat, teff, and sorghum that wouldn’t do well otherwise. Changing planting dates for various reason—for example to avoid pest damage or because the rains come late—can also help increase yields, though farmers need to be careful and follow recommendations from experts. For example, if farmers planted wheat, teff, maize, or sorghum four weeks early, they likely wouldn’t get good yields.

One other type of improved crop management is changing the crops you grown, for example, by changing from planting maize to planting sorghum. This can work, but it might take a number of years for farmers to break even after making this change.

**HOST 1:** You’ve given us a lot of think about. But if I can summarize, first you talked about the changes in climate projected for Ethiopia over the next 30 years, until 2050. You said that we’d have higher temperatures, and that the rainy season would be longer. And then you talked about what farmers could do to best adapt to these changes in heat and rainfall. You said that two kinds of practices are the most promising: agroforestry and improved feed and fodder. And you said that, in addition to this – and in combination with them – two other promising practices are irrigation and improved crop management. Have I got that right?

**HOST 2:** Yes, those are the conclusions of the scientists from the Potsdam Institute for Climate Impact Research. These are the expected changes to the climate and the recommended practices for farmers.

 But of course, it’s always best for farmers to talk to local and regional experts if they want to plant trees or improve their livestock feed – or grow irrigated crops, or change what crops they grow. The exact recommendations depend on where you live and what your situation is.

 Nevertheless, no matter where you live, these are recommendations that farmers can take seriously.

**HOST 1:** Thanks so much for this. We’ll be back next week with more from [name of program]. Talk to you then.

**HOST 2:** Goodbye until next week.

## Acknowledgements

Contributed by: Vijay Cuddeford, Managing editor, Farm Radio International

Reviewed by: Dr. Christoph Gornott, Head of working group "Adaptation in Agricultural Systems" at the Potsdam Institute for Climate Impact Research (PIK), and Lisa Murken, Research Analyst in the working group "Adaptation in Agricultural Systems" at PIK.

**Sources of information**

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