

STUDY GUIDE FOR
ADULT CHRISTIAN EDUCATION

Just Climate



JUST CLIMATE: STUDY GUIDE FOR ADULT CHRISTIAN EDUCATION

Written by: Adam Bray, Chloe Schwabe, and Christy Merrick

Edited by: Cassandra Carmichael

National Council of Churches USA
Eco-Justice Programs
110 Maryland Ave., NE
Suite 108
Washington, DC 20002
202-544-2350
www.nccecojustice.org
info@nccecojustice.org
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RESOURCES FOR FURTHER STUDY

These and additional resources are available online at
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Climate and Church: How Global Climate Change will Impact Core Church Ministries: A report that outlines the impacts that global climate change will have on core church ministries such as refugee resettlement, feeding the hungry, and disaster relief. Available online at www.nccecojustice.org

Cry of Creation: A Call for Climate Justice: A study guide on global warming produced by the Interfaith Climate and Energy Campaign designed to inspire faith-based communities to take action to curtail climate change. Available online at www.nccecojustice.org

God's Creation and Global Warming video: An excellent tool for introducing the issue of global climate change. Available from 800-762-0968 for \$10.00. The order number is EJ0017 or by contacting the NCC Eco-Justice Program office at info@nccecojustice.org.

It's God's World: Christians, Care for Creation and Global Warming: A five-session study guide on global warming that interweaves information on Climate Change with relevant biblical passages. Available online at www.nccecojustice.org

The Poverty of Climate Change Earth Day Sunday resource: An education and worship resource that recognizes the interconnectedness of poverty and climate change. Available online at www.nccecojustice.org

CLIMATE CHANGE 101

SESSION 1

OVERVIEW

God created an Earth that God declared “good,” one that works as an interconnected whole. The workings of God’s creation are both wonderful and complex. And, the workings of the atmosphere and the carbon cycle are no exceptions. Climate change is a hot topic today, but not everyone understands the issue. This activity is designed to help your group better understand how our atmosphere works, why it’s heating up, and what impacts global warming is having on the planet.

GOALS

As a result of this session, participants will be able to:

- Appreciate how God’s creation works as an interconnected whole
- Provide a brief overview of why the Earth’s climate is warming.
- Describe at least one way climate change is affecting life on Earth.

MATERIALS

- Markers (at least four)
- Large pieces of paper such as flip charts or poster board (at least four)

BEFORE THE SESSION

Before the session starts, review the activity. You’ll be leading a simulation that requires an area for the participants to move around the room. The simulation doesn’t require any specific amount of space or layout, but you should evaluate your space before the session and make a plan for how you’ll lay out the room for the simulation. You will need at least seven participants for the simulation. Designate one side of the room as the “surface of the sun,” and the other side of the room as the “Earth.” The area in between is “the atmosphere.” The area between the “surface of the sun” and the “Earth” should be clear of any obstacles such as tables or chairs.



HOSTING THE SESSION

The Bible and God’s Creation

Genesis 1:1-31, 2:15, Job 38:1-21

Read out loud, together or individually by line, the Genesis scripture passages. What do these passages say about God’s Creation and God’s relationship with Creation? What do the passages say about humankind’s relationship with Creation?

What's Climate Change?

Begin by asking the group how many have heard of the problem of global warming, or climate change. Can anyone explain what it is? While most people have heard about this problem, many are unsure why the problem exists or what it means for God's Creation. Today's session should help everyone better understand this complex issue.

Explain that you have a brief simulation that'll help explain how the atmosphere works to create a livable climate, and how it's changing. Ask everyone to clear away the chairs in the room, because you'll need the space open to simulate how the atmosphere works. Then explain that you'll be looking at the way that energy travels from the sun to the Earth, and then is radiated away from the Earth.



Show the participants the areas of the room that represent the surfaces of the sun and Earth. Then select participants to represent the sun's energy. Ask about half of the participants to become sunlight, and have them line up across the area of the room you've designated as the surface of the sun. Explain that the sun's energy travels to the Earth in the form of light, but once it hits the surface of the Earth, the energy bounces off in the form of heat. Tell the participants that this group will demonstrate this during the simulation.

Next, ask about half of the remaining participants to represent greenhouse gases in the Earth's atmosphere, and distribute them in a line parallel to the surface of the Earth, closer to the Earth than to the sun. They should be spread out evenly in a line across the simulation area.

Explain that the people representing the greenhouse gases in the Earth's atmosphere are certain gases in the atmosphere that play an important role in regulating the Earth's temperature. They allow the sun's energy to pass through them as light when it arrives at the planet, but reflect the sun's heat energy when it bounces off the surface of the Earth.

To simulate this, explain that the participants representing greenhouse gases in the atmosphere should turn to the side to allow the participants representing sunlight through, but once the sunlight has passed through, they should turn to face the surface of the Earth and extend their arms. (If your space is small and the participants' hands would almost be touching if their arms are extended, don't have them extend their arms.)

If you are using a large space, make sure that the activity area you mark off is small enough so that when the participants representing greenhouse gases in the atmosphere put their arms out they are close enough together to stop the participants representing the sunlight.

To do the simulation, explain that the participants representing sunlight should walk across the room in a straight line to the surface of the Earth, passing by the participants representing greenhouse gases in the atmosphere. Once they reach the surface of the Earth, they should "bounce" off and walk away from the surface of the Earth in a straight line, at any angle they choose, making sure that they remain in the marked off activity area (note: it will be important to mark off the activity area if your room is large). If they come in contact with a participant representing greenhouse gases in the atmosphere, then they should "bounce" or move back toward the surface of the Earth, and should continue to walk back and forth inside the atmosphere. If they can walk through without touching a participant representing greenhouse gases in

the atmosphere, they should do that and remain outside of the atmosphere. Once everyone understands their role, have them begin the simulation.

After the simulation is complete, discuss what happened. Ideally, some of the heat energy should have passed through the atmosphere and some should have been reflected back. Note that you can also draw the simulation on a large sheet of paper or on a chalk or wipe board if it helps the participants understand their roles before performing the activity. Explain that this is what has made the Earth's climate so hospitable for life. Because some of the sun's heat stays close to the Earth, it's much warmer on the planet than it would otherwise be. If the greenhouse gases in the atmosphere that reflect the heat energy were not there, all of the heat would have been free to leave the Earth's atmosphere, and the Earth would be a very cold place. Instead, some of the heat stays close, and the result is temperatures that make life possible.

Ask the participants if they can they guess why greenhouse gases got this name? (The gases act much like the glass in a greenhouse, which lets light in, but traps the heat inside the greenhouse, making it warm inside even when it's cold outside.)

Explain that the simulation isn't over yet, though. You've only just simulated how things worked in the past. Things today are a little bit different. Explain that around the time of the Industrial Revolution, things started to change in the atmosphere. With the introduction of new technologies that required burning coal and other fossil fuels in record amounts, we started to put a lot more carbon dioxide into the atmosphere, and carbon dioxide is a key greenhouse gas. Methane and nitrous oxide are other greenhouse gases, but carbon dioxide is the most common of these gases.

Scientists studying the make-up of our atmosphere using gases trapped in Arctic ice have found that concentrations of greenhouse gases have increased sharply as a result of human activities since 1750. What effect is this having on our planet? The next phase of the simulation will help your participants find out.

GREENHOUSE GASES

Major greenhouse gases include water vapor, carbon dioxide, methane, and nitrous oxide. Of these greenhouse gases, carbon dioxide has received the most attention because of its sheer volume in the atmosphere and because carbon remains in the atmosphere for a long time.

Carbon dioxide has an atmospheric lifetime of between 50 - 200 years. According to the U.S. Environmental Protection Agency, carbon dioxide accounts for 85 percent of all human generated greenhouse gas emissions and global atmospheric concentrations of CO₂ were 35 percent higher in 2005 than they were before the Industrial Revolution. Burning of fossil fuels (oil, gas, coal, etc.) and deforestation are leading causes of higher carbon dioxide.

According to the U.S. Department of Energy, methane, which comes from landfills, coal mines, oil and natural gas operations, and agriculture, represents 9 percent of total human generated greenhouse gas emissions. Methane stays in the atmosphere for only 10 years, but traps 20 times more heat than carbon dioxide.

Nitrous oxide (5 percent of total emissions), is emitted through the use of nitrogen fertilizers, from burning fossil fuels, and from certain industrial and waste management processes.

Ask the participants who represented sunlight to return to the surface of the sun for another round of the simulation, and ask the participants representing greenhouse gases in the atmosphere to return to their posts. Then explain that since the sun hasn't changed much since the Industrial Revolution started, but the amount of carbon dioxide in the atmosphere has increased, ask the remaining participants who didn't participate in the last round to enter the simulation representing more greenhouse gases in the atmosphere. They should arrange themselves around the other participants representing greenhouse gases in the atmosphere, filling in some of the empty spaces that existed before. Explain that everything in the simulation will work the same way in this round, and have the participants begin.

Ask the participants what happened this time. They probably found that more heat energy was trapped closer to the surface of the Earth. Ask what effect this might have on the Earth's climate. (This problem is often called global warming because the excess heat energy that's trapped near the surface of the Earth is causing temperatures around the Earth to rise.) Explain that in the next part of the activity, you'll be looking at what effect this warming might have on the Earth.

Effects of Climate Change

Now that you've established that things are heating up on the planet, it's time to think a little bit about what that might mean for life on Earth. Your group might be surprised to learn that life is changing around the globe in some unexpected ways. For the rest of the activity, you'll challenge the group to think creatively about all the ways that a warmer planet could affect life on Earth.

Divide the participants into three groups of equal size and give each group a large piece of paper and several markers. Explain that each group will be thinking about a different way in which warmer temperatures are affecting life on the planet. Assign one group to consider how warmer

temperatures could affect the Earth's weather, oceans, and ice; another group should brainstorm possible effects on plants, animals, and habitats; and the third group should consider effects on human communities.

Remind the groups that this is a brainstorming session, so they should feel free to think as creatively as possible; scientists who are studying this issue have to think openly and creatively about possible effects and your group should too. Ask the groups to spend about 10 minutes brainstorming, and let them know they should be prepared to explain their results to the rest of the group at the end of the 10 minutes. To share their results, they might list some of their top ideas on the paper provided, draw pictures to illustrate their main points, or use any other approach they like, but they should limit their presentation to not more than 3 minutes.

As the groups brainstorm, circulate and help the groups develop their ideas. Make sure the groups don't worry too much about staying strictly within their own subject area. Life on God's Earth is interconnected, and each of these areas overlaps significantly. Use the discussion guide provided to help answer any questions or provide guidance as needed.

After the brainstorming session, have each group make their short presentation. Use the discussion guide to help fill in details, add additional impacts the groups might not have considered, and correct any misconceptions.

Wrap up by asking the group to consider what this issue means to them as Christians. As they learned, the problem of climate change will have far-reaching effects on life on Earth, but what does that mean practically for God's people? If you'll be doing Session Two, let them know that the next activity you have planned will help further explore the ethical implications of this environmental problem.

Close the session in prayer.

CLIMATE CHANGE 101

DISCUSSION GUIDE

Understanding the climate of God's Earth and predicting how it'll affect everything on the planet from the weather to politics is not an exact science. If you've ever been caught outside without an umbrella because of an inaccurate short-term forecast, you can imagine how challenging it would be to predict far-reaching changes on a global scale.



That being said, however, scientists do agree that the Earth is warming as a result of human activity, and that warming is already affecting a variety of aspects of life on Earth. National and international science academies and professional societies have assessed the current scientific opinion on climate change and have largely followed or endorsed the Intergovernmental Panel on Climate Change's statement that "An increasing body of observations gives a collective picture of a warming world and other changes in the climate system... There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities." And, scientists and governments are working hard to better understand those changes, prepare for them, and offset them as much as possible.

The following are discussion points you can use with your group as they think about some of the ways a changing climate is affecting life on God's Earth. The list isn't exhaustive, and because of the time constraints for the activity, the information is not in depth.

WEATHER, OCEANS, AND ICE

- **Increasing average temperatures**—Eleven of the last twelve years (1995-2006) are among the twelve warmest years on record for global surface temperature. Average Northern Hemisphere temperatures during the second half of the twentieth century were very likely higher than any other 50-year period during the past 500 years, and likely the highest during the past 1300 years.
- **More warm days and nights and fewer cold days and nights**—Over the past 50 years, cold days, cold nights, and frosts have become less frequent, and warm days and nights have become more common.
- **More heat waves**—Heat waves have become more common over most land areas.
- **Changing rainfall patterns**—From 1900-2005, precipitation has increased significantly in some parts of the world and has also decreased in other parts of the world. Since the 1970s, areas of the globe affected by drought have likely increased.

- **Earlier start to spring**—This includes not just warmer spring temperatures earlier in the year, but also changes in plants and animals as they respond to an earlier start to spring.
- **More intense tropical storms**—There has been an increase in intense tropical cyclone activity since 1970 in the Northern Atlantic.
- **Melting of sea ice**—Since 1978, Arctic sea ice has decreased on average 2.7 percent per decade.
- **Melting and receding glaciers**—Mountain glaciers and snow cover have decreased in both the Northern and Southern Hemispheres.
- **Sea level rise**—Since 1961, average global sea level has risen at an average rate of 1.8 mm per year. Since 1993, it has risen at a faster rate of 3.1 mm per year.
- **Changes in global ocean currents**—Changes in the ocean's temperature, salinity, and other factors could change ocean currents over the long term.

PLANTS, ANIMALS, AND HABITATS

- **Enlargement and increased numbers of glacial lakes**—As glaciers melt, new habitats are being formed in glacial lakes.
- **Changes in Arctic and Antarctic ecosystems**—Melting ice has led to changes in ecosystems at both poles.
- **Changes in river habitats**—More runoff from melting ice, and earlier spring runoff, are creating changes in river habitats.
- **Changes in the ranges of plants and animals northward**—Plants and animals are being seen in more northern areas across the globe.
- **Changes in plant and animal communities in marine environments**—Plant and animal communities are changing in response to changes in ocean temperature, salinity, and other climate-related factors.
- **Loss of coastal wetlands**—As sea level rises, coastal wetlands are likely to be flooded and lost.
- **Changes in the timing and location of migrations**—Scientists are observing changes in the length, timing, and locations of the migration routes of many species. In some extreme cases, species have stopped migrating all together.

HUMAN COMMUNITIES

- **Changes in agricultural crops**—Higher temperatures and earlier start to spring will likely cause changes in the management of agricultural crops. These changes may be especially difficult for small-scale farmers.
- **Health effects from disease**—Some infectious diseases are expected to increase their range, and numbers of people they affect, as temperatures warm. (For example, mosquitoes, which are vectors for malaria, are expected to be able to live in more habitats as temperatures warm.)
- **Health effects from increased heat waves**—Increases in heat-related deaths are expected in connection with increased frequency of heat waves.
- **Changes in alpine recreation**—Increasing temperatures and changing precipitation patterns are likely to cause changes in outdoor recreation (such as skiing) in alpine areas.
- **Conflicts related to changing resources**—Hundreds of millions will be exposed to increased water stress as temperatures increase. These decreases in resource availability are expected to increasingly lead to political and social conflicts.
- **Increased damage from floods and storms**—As sea level rises, coastal floods and storms are likely to affect coastal areas more than they have in the past.
- **Increase in breathing-related illnesses**—Because air quality decreases with increasing temperature, the incidence of breathing-related illnesses such as asthma, which are often triggered by poor air quality, are expected to increase.
- **Relocation of coastal communities**—Small coastal communities, including entire low-lying islands, are making arrangements to move their inhabitants to higher ground, and, in some instances, to other countries if suitable land is not available.
- **Changing food sources for native communities**—Communities, such as native populations in Alaska, that depend on wildlife for food are finding that their traditional food sources are becoming scarcer.

Note: Most of the information contained in this discussion guide was provided by the Intergovernmental Panel on Climate Change, a scientific body created by the United Nations and the World Meteorological Organization.

LIVING UNDER THE BLANKET

SESSION 2

OVERVIEW

Climate change is not just a scientific theory. It's also a global problem with major social implications. But the effects of climate change are not the same across the globe. And, unfortunately, those who are least responsible for climate change are also the people who will likely suffer the most. In this activity, your group will learn more about the differences between the impacts of climate change in a developed country such as the United States and developing nations such as Sudan, Bangladesh, and Nepal. They'll construct a quick "quilt" that symbolizes each nation's contribution to climate change as they learn more about how people in each country will be affected as we live under the blanket of climate change.

GOALS

As a result of this session, participants will be able to:

- Understand our call as God's people to work for justice.
- Explain that people in different countries emit different amounts of climate-warming gases
- Describe at least one example of an impact of climate change in a developing country
- Describe at least one example of an impact of climate change on vulnerable populations in the U.S.
- Describe their one personal view on the moral and religious implications of the disparity of climate impacts

MATERIALS

- Flat bed sheet (top sheet), preferably full or queen size, in a light color without a very noticeable print
- Permanent markers in a variety of colors
- Safety pins, about 12
- 3 Copies of the "Climate File" work sheet
- Copy of each of the developing country Fact Sheets
- 3 manila envelopes or file folders, one for each "Climate File" (optional)
- 48 pieces of candy or another such small treat
- three small swatches of material in three different colors
- three safety or straight pins or tape to attach material to the sheet



BEFORE THE SESSION

In this session, your group will construct a mock "quilt" blanket that demonstrates the emissions of carbon dioxide of four average people from four different countries. The group will also participate in an activity that demonstrates how some communities in the U.S. will suffer disproportionate climate impacts. Before the activity begins, read through the activity to familiarize yourself with how it will work and what the quilt is designed to demonstrate. Then you'll need to prepare a flat bed sheet so you can give each team their corresponding square of fabric during the activity.

Find a flat bed sheet or something similar that you can use to simulate the blanket, or quilt. A sheet that's not too big and light colored without a prominent print (the group will be decorating the sheet, so permanent markers need to be easily visible) is best.

To prepare the sheet, you'll need to cut your sheet into four pieces or patches, one to represent the emission contribution from each of the countries that the quilt blanket represents. The three groups that represent developing countries will each receive one small patch, and the rest of the blanket will represent the emission contribution of one person from the United States.



The following is one way to divide up the patches: Because the emission contribution of an average person from Bangladesh and Sudan is very similar at 0.25 and 0.29 metric tons, respectively, these two patches can be the same size for the purposes of this activity. A Nepali's emission contribution is about half of this at 0.11 metric tons. The average U.S. citizen's emission contribution is about 81.5 times that of someone from Bangladesh or Sudan. Therefore, if you divide the blanket into 84 equal units, one would go to the person from Bangladesh, one to the person from Sudan, one half to the person from Nepal, and 81 and a half to the person from the United States.

You can divide the quilt blanket into 7 by 12 equal rows to create 84 equal units (they'll probably look like rectangles). The exact dimensions of the rectangles will depend on the dimensions of your sheet. Cut out one rectangle for Sudan, one for Bangladesh, and half of one rectangle for Nepal. Be sure to leave the other half of Nepal's rectangle attached to the rest of the sheet, since the remaining 81.5 squares represent an average person's share of carbon emissions for the United States.

Reassembly of the blanket during the activity will be easiest if you cut out the rectangles for the three countries from one of the corners of the sheet so that they are all together. For example, you might cut all the rectangles from the left side of the top row. The remainder of the

sheet, except a small section of the top left corner, would represent the United States' patch.

Decorate the United States' patch however you choose. You can make it as colorful and full of images as you like, or it might be plain with just the words "United States" clearly visible. When you conduct the activity, keep the United States' patch folded and out of plain sight of

the participants until you use it add to the other patches.

Gather safety pins to use to assemble the quilt during the activity.

Next, assemble the "Climate Files." For each group, make a copy of each of the pages of their climate file information, included at the end of this activity. Also include in the file the group's corresponding undecorated fabric square and several permanent markers they can use to decorate their square. Clearly label each file with the name of the country it represents. Finally, make one copy for each of the four U.S. climate impact sheets, which are included at the end of this activity.

HOSTING THE SESSION

The Bible and Justice

Micah 6:8

Read out loud, together or individually by line, the Micah scripture passage. Tell the participants that you will be discussing the passage at the conclusion of the activity.

Introduction

Begin the session by asking the participants how they are already or they might soon be affected by climate change in their own daily lives. As they share their answers, write

them up on a board or piece of flip chart paper where everyone can read them. After you've gathered a variety of responses, explain that in this activity you'll be looking at the ways climate change is affecting people's lives around the world, and that you'll get back to some of the ways everyone has mentioned that climate change is affecting them later on in the session.



Next, briefly review the basics of climate change. (Note that this activity assumes that your group has either already completed Session One or already has a fairly good understanding of the basics of why climate change is happening.) You might quickly discuss that the problem comes from humans, who are emitting carbon dioxide and several other gases that trap heat in the Earth's atmosphere, causing temperatures to rise over time. The most problematic of these gases, carbon dioxide, is released when we burn fossil fuels, such as petroleum and coal, and levels of carbon dioxide in the atmosphere have been increasing since the start of the Industrial Revolution.

Because carbon dioxide acts much the same as the glass in a greenhouse, letting the sun's light in and trapping the warmth inside, it's often called a "greenhouse gas," and the warming it's causing is called the "greenhouse effect." Others have compared carbon dioxide and the other greenhouse gases to a large, invisible blanket that has been laid over the planet, trapping heat underneath and causing everything under it to warm. Because the gases we're emitting float up into the atmosphere and can move freely, this blanket covers everyone equally, and doesn't stay fixed over just those people or regions that emit the most carbon dioxide.

Scientists believe that even what might seem like small increases in average temperatures can have surprisingly large effects on the Earth's climate. In fact, many point

to the planet's rapidly melting glaciers and polar ice caps, changing weather patterns, and other evidence as early signals that the climate has already begun to change.

What effects will these changes have on people around the planet? In this activity you'll look a little more closely at how living under the blanket of climate change is affecting or might affect people around the world.

Explain that you're going to break into three smaller groups, and that each group will be taking a closer look at a different country. Each of these countries is still developing, and each faces unique challenges in confronting climate change.

Investigating the Climate Files

Break the group into three smaller groups, and then explain that each group will receive a climate file containing information about a different country and questions to answer in a short presentation to the group. There's also a simple art project for the group to complete. Explain that each file contains a piece of a quilt that they'll be constructing. The quilt represents the contributions of average people to the climate-warming "blanket" that we live beneath. Explain that each group has 15 minutes to review the materials and prepare their presentation and their quilt patch, and then can take up to 5 minutes to make their presentation when everyone is done.

When the groups are ready, have each select one representative to make their presentation. Allow for a short discussion among the group if questions come up during or after each presentation. After each person has shown their piece of the quilt, use the safety pins to attach the pieces to each other. Remember that Nepal's patch, which is half the size of the other two pieces, should be placed where it will fit with the United States' piece, which you will add next. Ask each presenter to remain in the front of the room after he or she has given his or her presentation. You can provide chairs for the presenters if they'd rather not stand through all the presentations.

The United States and Climate Change

After the three developing countries have made their presentations, explain that you wanted the United States to be represented, too. But since we're all fairly familiar with our country, and what life is like here, you will quickly review some of the pertinent facts rather than having a group look into it as they did for the other countries.

Unlike the three countries the groups have already looked at, the United States is a developed country.

- **Size:** The United States is the world's third-largest country by size (Russia and Canada are bigger).
- **Climate:** Because it's so big, the US has a variety of climates, from the tropics of Florida and Hawaii to the Alaskan arctic. It is home to deserts, rain forests, large river deltas, coral reefs, and more.
- **Economy:** The United States has the largest economy in the world, and only 12 percent of people here live below the poverty line (compared to one-third of Nepalese and nearly half of Bangladeshis). Ninety-nine percent of people over 15 can read and write (compared to Nepal and Bangladesh, where less than half the population is literate, and Sudan where just 60 percent is literate) and our average life expectancy at birth is 78 years (that's 29 years longer than someone in Sudan, 15 years longer than an average Bangladeshi, and 17 years longer than an average Nepali). Many of the diseases that threaten lives in some of the other countries we looked at have been wiped out here, or are very rare.

- **Carbon dioxide emissions:** Our strong economy lets us enjoy a standard of living few others enjoy. We live in relatively large houses, we have electricity and clean water on demand, most of us drive cars, and we enjoy lots of other modern conveniences. Those conveniences do come with a price, however. The United States is one of the largest emitters of carbon dioxide. Per person, we emit 44,974 pounds (20.4 metric tons) of carbon dioxide (that's 70 times larger than the contribution of the average Sudanese, 81 times the contribution of the average Bangladeshi, and 185 times larger than the contribution of the average Nepali).

Show the US quilt piece. Ask the three representatives of each of the other countries to help you assemble and hold up the quilt, so that you're all standing behind (or "under") the blanket. Remind everyone that this blanket represents 100 percent of the annual contributions of carbon dioxide of the four people holding it up and does not represent the emissions from the entire globe. Although everyone must live under the blanket, most of those living under it did not contribute much to it at all. And the ways that it will affect life for everyone are different. Assemble the session participants back together as a larger group for the next section on U.S. climate change effects.

Effects of climate change

Climate change will definitely affect people in the United States, too. Scientists think that we can expect higher sea levels, melting glaciers and snow packs, warmer average temperatures, more heat waves, changes in the distribution of plants and animals, extreme stresses or even losses of some ecosystems, and other impacts. Review some of the responses to how climate change is affecting the participants' daily lives that you discussed earlier. Ask the participants how our strong economy, government, education, and some of the natural features of our country make a difference in how these changes will affect our population. How do the people representing the different countries feel about these inequities? The quilt that the group has constructed demonstrates just how lopsided carbon dioxide emissions can be, when you compare the emissions

of people in a developed nation like ours to emissions of those in developing nations that already have significant challenges.

An Unequal Burden

Have the participants lay the quilt down on a table or the ground and explain that although the U.S. citizens are in a stronger place to respond to the impacts of global climate change, there are populations in the U.S. who will be particularly vulnerable to climate impacts. Divide the group into four seated groups. Designate one group to represent average people living in the U.S., one group to represent communities of color in the U.S., one group to represent the elderly in the U.S., and one group to represent the youth in the U.S. Take out and pass out U.S. Climate Impact Sheets to each of the four groups. Hand out 12 pieces of candy (or another small treat) to each of the four groups. Instruct each group that they are not to consume the candy yet. Explain that the candy represents some of the privileges and benefits we have because we live in the United States. Remind the group, however, that people living in the U.S. will all feel the impacts of global climate change. Ask for one candy or treat back from each of the four groups. Next, read out loud the impacts each of the three different groups—communities of color, the elderly, and children—will experience. For each impact that is read ask for one candy or treat back from the appropriate representative group. For example, you would ask for a candy or treat back for the heat wave impact and noxious air impacts felt by the elderly community. After reading all of the impacts, allow each group to consume their candy and discuss these impacts. If the groups with more candy share their candy with the other groups, note that action as part of the discussion. If sharing does not happen organically, make sure that you ask the larger group during the conclusion and debriefing how we, as Christians, can share our privileges and benefits with others.

Conclusion

Climate change is unlikely to lead to genocide here, as it could be in Sudan. We are much more able to control the waters in our dams, unlike the government of Nepal. And

we have much more capacity to redirect rising waters away from coastal communities, unlike Bangladesh. People in the United States are much less likely than people in the countries we looked at to starve, be attacked, die from disease, or face other life-threatening impacts of climate change. We have the economic strength, education, and good health to be able to tackle these challenges, giving us a great advantage over other less-developed nations.

Across the world, those people that have fewer resources and emit less carbon dioxide are less responsible for the changes climate change will bring, but they will suffer the most dire consequences. Even within the United States, this is the case: poorer communities will bear an unequal burden of the impacts of climate change.

End the activity by asking your group to reflect on these inequities and what they mean for them as Christians. While ultimate ownership of creation is God's, we have a responsibility to care for all of God's creation—both human and nonhuman. And as God's people, we have a responsibility to work for justice. Have the participants review the scripture passage from Micah and discuss its connection to the activity. Close the session with prayer.



CLIMATE FILE

Use the information contained in this file to learn more about your country and how climate change might affect you as a resident of your country. As you learn about life in your country, answer the following questions, and be prepared to share these answers with the entire group when you reconvene:

What is the name of your country and where is it located?

What is life like in your country?

What are some of the potential impacts of climate change on your country?

Per person, how much carbon dioxide do you emit in your country?

You also should receive in your file a piece of fabric that represents your piece of the climate change “blanket.” Like a quilt, it’s a patchwork of contributions from a variety of sources. Your piece represents the carbon dioxide emissions of one person from your country. Use the markers you’ve been given to decorate your fabric piece however you choose, but please be sure that the name of your country appears on the piece so that it can be identified when the quilt is assembled.

- Group time limit: 15 minutes
- Presentation time limit: 5 minutes



BANGLADESH FACT SHEET

LOCATION

Bangladesh is located in Southern Asia. It is bordered by India to the west, east, and north, it shares a small border with Burma to the west, and borders the Bay of Bengal to the south. In land area, Bangladesh is slightly smaller than the state of Iowa.

TOPOGRAPHY AND CLIMATE

Most of Bangladesh consists of low, flat river deltas where the region's large rivers that begin in the Himalayas, including the Ganges, empty into the Bay of Bengal. Floodplains cover 80 percent of the country.

Bangladesh's climate is warm and tropical. It's dominated by a summer monsoon, but the country also experiences a relatively short winter, when temperatures are cooler and it's generally dry. During the monsoon season, temperatures are warm and torrential rains fall throughout the season. Pre- and post-monsoon seasons bring warm temperatures and occasional rain. More than 80 percent of the country's annual rainfall comes during the monsoon season.

The country's Southwest coast is home to the Sundurbans, the world's largest contiguous mangrove forest. (The second-largest mangrove ecosystem is only about one-tenth the size of the Sundurbans.) This ecosystem is home to an incredibly rich—and globally threatened—variety of species, including the Royal Bengal Tiger. The United Nations has named the Sundurbans a world heritage site.

ECONOMY

According the US Central Intelligence Agency Factbook, "Bangladesh remains a poor, overpopulated, and inefficiently governed nation." Bangladesh is one of the world's most densely populated countries. Forty-five percent of Bangladeshis live below the poverty line. Less than half (43 percent) of Bangladeshis over 15 years old can read and write.



Nearly two-thirds of Bangladeshis work in the agricultural sector; rice is the most important crop.

Most of the country's recent economic growth has come from the export of garments and from money sent home from Bangladeshis working in other countries.

Because of its geographic location on a plain of river deltas, Bangladesh faces a variety of challenges that affect its population and economy. Flooding is a major challenge to this country, as its low land makes it vulnerable to floods each year with the monsoon rains. Each year, 30 to 70 percent of the country can be flooded. In addition, the country faces threats from floods created by sea water in the form of storm surges, and, occasionally, tsunamis.

The moist tropical weather and many rivers and deltas make water-borne diseases another major impediment to life and economic development in Bangladesh. Malaria, dengue fever, hepatitis A and E, typhoid fever, and other diseases all pose risks.

CLIMATE CHANGE

Flooding is already a major challenge for Bangladesh, and climate change threatens to make this an even bigger challenge over the coming decades. Flooding related to climate change is a threat both on the coasts and in the river deltas. Most of the country's population is located in its most low-lying areas.

Virtually all scientists agree that warming global temperatures will cause sea levels to rise as ice melts and the ocean expands. Rising sea levels are a major threat to a low-lying country like Bangladesh. The Organization for Economic Cooperation and Development estimates that a 1 m rise in sea level would inundate 18 percent of Bangladesh's land, threatening 11 percent of the population. The associated rise in river levels from sea level rise could affect 60

percent of Bangladeshis. These kinds of changes would displace tens of millions of people, as Bangladesh does not have the financial resources or infrastructure to adapt to changes on a scale this great.

Climate models suggest that, in addition to increasing temperatures, precipitation will increase during the summer monsoon and that dry winter conditions, even drought, will likely become worse.

In addition, some scientists think that tropical cyclones, the equivalent of hurricanes, could increase in frequency, intensity, and precipitation. While scientists do caution that these kinds of predictions are especially difficult to make, they also warn that the fact that there is evidence that these storms could become more frequent and intense should be a major concern for Bangladesh because of its unique vulnerability to these storms.

More intense storms would bring larger storm surges and greater precipitation. Currently, storm surges range from 1.5 to 9 meters in height. With most of the country's land close to sea level, these surges are already a major threat to life and property, and higher surges would reach farther inland and create even more devastation. Greater precipitation with these storms would only compound the problems.

Ecologically, sea level rise also threatens the Sundurbans, coastal mangroves that are globally unique. A rise in sea level of 45 cm would inundate 75 percent of the Sundurbans, and 67 cm rise would eliminate this ecosystem. Not only would this represent the loss of a unique ecosystem and a global heritage site, but it would also eliminate a source of income and home to many Bangladeshis.

Carbon Dioxide Emissions: 0.25 metric tons (551 pounds) per person

NEPAL FACT SHEET

LOCATION

Nepal is a landlocked nation located in Asia. China borders the country to the North, while India borders the country on the East, West, and South.

TOPOGRAPHY

Slightly larger than the state of Arkansas, Nepal is a relatively small nation. But despite its small size, the country's landscape varies dramatically. The nation rises from a low river plain in the south to a central hill region, which rises into the rugged Himalayas in the north. In fact, the nation is home to eight of the world's ten highest peaks, including Mount Everest at 29,035 feet (8,850 m).

In addition to their unparalleled scenic beauty, the Himalayas also serve a very practical function for the region. The range holds the largest concentration of glaciers outside the polar ice caps. Because of the very large amount of freshwater these glaciers provide, the region is sometimes referred to as the "water tower of Asia."

ECONOMY

Nepal is among the world's poorest and least developed countries. Almost one-third of the population lives below the poverty line. Less than half (48.6 percent) of the population over age 15 can read and write.

Agriculture provides a livelihood for three-fourths of the population. Most of the nation's industrial activities involve processing agricultural products.

The nation's best prospects for economic development lie in expanding its tourism industry and in hydroelectric power. Because of Nepal's mountainous terrain and many rivers, the nation has an unusually large potential to supply hydroelectric power, but some experts believe that the nation is currently only exploiting some 6 percent of its hydroelectric potential.



CLIMATE CHANGE

Unfortunately, air temperatures have not been closely monitored in the Himalayas until relatively recently. Since the mid-1970s, however, average air temperatures at 49 stations in the Himalayas have risen 1 degree Celsius (1.8 degrees Fahrenheit). This is twice the rate of warming for the mid-latitudes of the Northern Hemisphere, which demonstrates how mountain regions are especially sensitive to climate change.

Sixty-seven percent of Himalayan glaciers are retreating, and scientists think the major cause is climate change. Today, the Khumbu Glacier, part of a popular route to the summit of Mount Everest, has retreated over 5 km (over 3 miles) from where Sir Edmund Hillary began the first ascent of the mountain in 1953.

Losses of Himalayan glaciers could be devastating for millions of people, and not just Nepalese people. Because these glaciers feed rivers that supply the region with water for drinking and irrigation, as well as maintain river habitats and wildlife, changes to the water system could be extremely serious. Scientists think that melting glaciers could increase river levels over the short term, but over the long term as the amount of freshwater in the ice declines, so too will runoff and river flows.

An especially large threat of receding glaciers is flooding. As glaciers recede, they leave large, deep voids behind, and those depressions fill with melting ice to create gla-

cial lakes. Although the lakes can grow to be very large, they are relatively unstable, often dammed by unstable slopes. Earthquakes, rockslides, avalanches, or other external events can cause the lake to overflow, sending a sudden, huge wave of water down the stream channel. These floods contain a mix of water and glacial deposits of soil and rocks, creating devastation as it rushes downstream.

In one famous flood from a glacial lake in 1985, the Dig Tsho Glacier Lake flooded the Langmoche Valley. A large piece of ice broke free from the glacier and toppled into the lake, which was already full. The impact caused the water level to rise, cutting a trench in the naturally formed dam of soil and rock that had held it back. Flood waters rose 30 to 50 feet (10 to 15 m) high in the valley. In all, the flood waves that lasted four to six hours released 200 to 350 million cubic feet (6 to 10 million cubic meters) of water, seriously damaged a hydropower project, washed away cultivated land, bridges, houses, livestock, and people.

The Nepalese government recognizes that glacial floods are a major threat to people and the development of hydropower projects, and have begun projects to reduce the threats and provide early warning of potential floods. Unfortunately, however, these projects are very expensive and the country's limited financial resources have severely limited this work.

Carbon Dioxide Emissions: 0.11 metric tons (243 pounds) per person

SUDAN FACT SHEET

LOCATION

Sudan is located in Northeastern Africa, south of Egypt. In land area, Sudan is slightly more than about one-quarter the size of the United States, making it the largest country in Africa.

TOPOGRAPHY AND CLIMATE

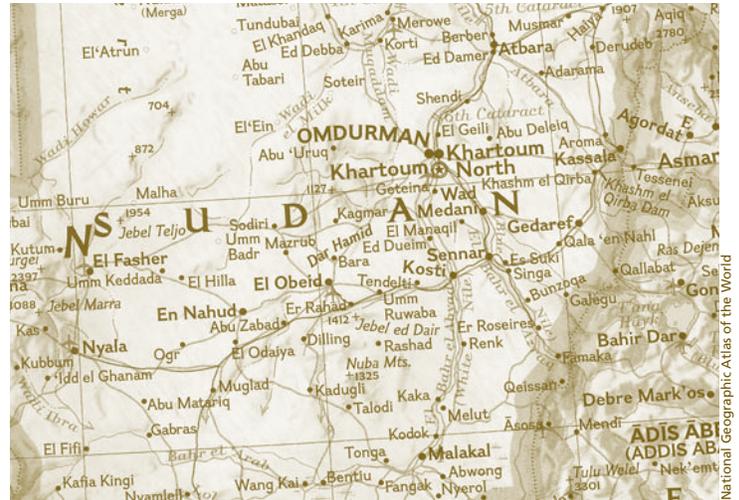
In general, Sudan is flat, though there are mountains in the far south, northeast, and west. Rainfall generally increases from north to south in Sudan. The northern part of the country is dominated by the Nubian Desert. Because water is so elusive, many in the north are nomadic. In addition, sand storms often plague the northern regions. As rainfall increases to the south, the southern part of the country is dominated by swamps and rain forests.

The country's capital, Khartoum, is located at the confluence of the Blue and White Nile rivers, where they join to form the Nile River. The tropical southern regions of Sudan are often inundated with annual floods of the Nile River System.

ECONOMY

Civil war, lack of basic infrastructure, and reliance on subsistence agriculture are keeping many Sudanese in poverty, although the country's economy is experiencing growth as it begins to export crude oil. Forty percent of the population lives below the poverty line, and forty percent of adults also remain illiterate.

Eighty percent of the population is employed in agricultural production. Most farms are not irrigated, but are instead rain-fed, and so are extremely susceptible to drought.



Sudan has faced many years of civil war. According to some estimates, over 2 million people were killed in two decades of civil war between the North and South, which ended in 2005. Millions more were displaced by fighting and famine. As the North-South conflict was beginning to resolve, the country's western region of Darfur broke out in a new conflict. Raging there since 2003, the conflict has displaced nearly 2 million people and killed 200,000 to 400,000 people.

Threats from major infectious diseases in Sudan are very high. Sudanese face high levels of food and waterborne diseases, malaria, dengue fever, and a variety of other diseases.

CLIMATE CHANGE

Many experts think Africa is the world's most vulnerable continent to global warming. The continent already faces a variety of challenges—poverty, drought, dependence on rain-fed agriculture, civil war and political and social tension—that will make it extremely difficult for countries to adapt to the rapid changes climate change could bring.

In particular, experts are concerned that Africans will face growing water shortages and water stress. And with dwindling water supplies comes the related problem of decreased agricultural yields, a major problem for a continent already facing famines. Areas suitable for agriculture, along with agricultural yields, are expected to decline. Since the mid-1980s, the number of food emergencies each year in Africa has tripled. Arable lands are giving way to expanding deserts, and temperatures have risen only 0.9 degrees F over the last 100 years. Over the next 40 years, temperatures could rise 3.6 or even 5.4 degrees F.

Sudan, with its widespread dependence on rain-fed agriculture, is no exception. And many experts believe that the stresses of trying to quickly adapt to a climate that is already changing have led to further social tensions that are only making matters worse for the Sudanese people.

United Nations Secretary-General Ban Ki-moon has said that he believes that the recent conflict in Sudan's Darfur region, in which Arabs and blacks have clashed in fighting so violent many have called the conflict a genocide, is actually rooted in climate change. According to the Secretary-General, "Almost invariably, we discuss Darfur in a convenient military and political shorthand—an ethnic conflict pitting Arab militias against black rebels and farmers." But, he says, "Look to its roots, though, and you discover a more complex dynamic."

He notes that until about two decades ago, when rainfall in the region began declining "due to some degree to man-made global warming," Arabs and blacks in the region coexisted peacefully. But as water and food shortages developed as a result of faltering water supplies, tensions developed, eventually erupting into tragedy.

Similarly, in testimony before Congress, former Army Chief of Staff General Gordon Sullivan called global warming a "threat multiplier" in some parts of the world, such as Africa, because it tends to intensify existing problems and tensions.

Carbon Dioxide Emissions: 0.29 metric tons (639 pounds) per person

U.S. CLIMATE IMPACTS

To be read aloud by the facilitator after dividing the larger group into four small groups representing the following: communities of color, elderly, children, and the everyone else. After reading each fact in italics, ask for the group representing that community to hand you back one piece of candy.

THE IMPACTS OF GLOBAL CLIMATE CHANGE ON COMMUNITIES OF COLOR

- Asthma will increase because of global climate change and will disproportionately impact African Americans, which are nearly three times as likely to be hospitalized or killed by asthma than whites.
- African Americans are disproportionately impacted by deaths during heat waves and from worsened air pollution. Future heat waves will be most lethal in the inner cities of the northern half of the country, such as New York City, Detroit, Chicago, and Philadelphia, where many African American communities are located.
- Unemployment and economic hardship associated with climate change will fall most heavily on the African American community.

According to a report from the Congressional Black Caucus Foundation, reducing emissions to fifteen percent below 1990 levels would mitigate these adverse health effects of climate change, while concomitantly decreasing air pollution related mortality, saving an estimated 10,000 African American lives per year by 2020.

THE IMPACTS OF GLOBAL CLIMATE CHANGE ON THE ELDERLY

The elderly, who are particularly vulnerable to changes in the environment, will, according to studies be disproportionately impacted by global climate change both here in

the U.S. and abroad. The National Institute of Health and the Center for Disease Control are preparing for these climate impacts, which include:

- Heat waves and noxious air (resulting from increased carbon dioxide in the atmosphere) In 2003, a heat wave killed nearly 15,000 people in France most of them elderly and recent heat waves in the U.S. have killed hundreds of elderly around the country. Projections have indicated that if a similar heat wave to the one in Europe in 2003 were to hit the United States, more than 3,000 people would die in New York City in a day and thousands more in big cities across the country.
- Droughts, floods, and extreme weather events.

THE IMPACTS OF GLOBAL CLIMATE CHANGE ON YOUTH

Today's youth will be left with a crippled Earth if we fail to take action to curb our carbon emissions and prevent catastrophic climate change. Though scientists are just beginning to understand the impacts of climate change on the world's youth, early reports indicate that climate change will enhance the factors that already threaten children's health. Worsening air quality, extreme weather events, and more frequent and intense heat stress events all burden children disproportionately. Worsening air quality leads to a higher incidence of asthma.

- Extreme weather events threaten the lives of children who are more vulnerable to weather extremes, especially those living in poverty who don't have the resources to escape impending disaster.
- Heat stress also overtakes young children whose bodies are unable to adjust as easily to changing temperature and who are unable to communicate that they are uncomfortable and overheating

AN ECOLOGICAL CREDO

SESSION 3

OVERVIEW

The purpose of this session is to help the participants think theologically about global warming and how it relates to our ideas about God and the Church. Throughout history, Christians have formed creeds, or faith statements, to summarize and articulate the beliefs of their religion. Most Christians are familiar with the Apostle's Creed and the Nicene Creed and recite them regularly during worship services. In creating an Ecological Credo, participants will think through what they believe about different tenants of the Christian faith and how they see the tenants relating to the environment and global warming.

GOALS

As a result of this session, participants will be able to:

- Describe at least one way in which scripture can help guide our thinking about the environmental issue of climate change.

MATERIALS

- Four index cards
- Poster board
- Marker

BEFORE THE SESSION

Read through the activity. Copy the guiding question and suggested scripture for each of the four groups onto a separate index card, with one card for each group.

HOSTING THE SESSION

What Is a Credo?

Briefly explain the meaning, history, and significance of Christian creeds using the following information:

- "Credo" is the Latin word for *I believe*.
- Creeds are statements or confessions of belief.



- Creeds stabilized the early Christian church and became a way to teach the beliefs to new converts.
- The earliest fully formed creed of Christianity is likely the Apostles' Creed.

Explain that the group will form their own Ecological Credo by formulating and writing down their tenants of faith as they relate to issues surrounding global warming.

Writing the Credo

Break the group into four smaller groups. Each smaller group will be responsible for coming up with a specific section of the Ecological Credo; the sections relate to God, Jesus, the Holy Spirit, and the Church.

After the small groups have been formed, give each group an index card with the group's guiding question and corresponding scripture passages. Inform the groups that they should read through the scripture and use it to create a belief statement that helps answer the guiding question. The groups should each write a two or three sentence belief statement and be prepared to present what they came up with and why.

Group 1

Guiding Question: What do we know about God's relationship to the Earth?

Scripture: Genesis 9:8-13, Job 12:7-10, Isaiah 41:17-20

Group 2

Guiding Question: How does Jesus teach us to respond to situations such as global warming that affect people in poverty, young, and marginalized most severely?

Scripture: Matthew 25:34-45, Luke 12:13-20, Luke 9:46-48

Group 3

Guiding Question: What do we know about the Holy Spirit's relationship to the Earth and to our call to action?

Scripture: Psalm 104: 25, 30, Galatians 5:22-25, Romans 8:6

Group 4

Guiding Question: What does the Bible tell us about the Church's relationship to the Earth and our responsibility to protect it?

Scripture: Ezekiel 34: 17-18, Proverbs 13:22

After the groups have formed their statements of belief, gather together to report to each other on what was decided. As each small group presents their statement to the larger group, allow time for questions and discussion. If the larger group agrees with the statements of belief, write down the statements on a poster board or butcher paper. After the last group presents, the group will have created an Ecological Credo that addresses global warming.

TAKING ACTION

If you and your group would like, you can use the credo you've created to help guide your church or group to more sustainable action. Place the Ecological Credo in a centralized place in your church where it can serve as a reminder to your congregants about the Christian responsibility to protect Creation and those who will be affected the most by global warming.

The group can brainstorm ways they can use the credo to help address the issue of climate change. They might create a taskforce to evaluate ways the church can cut its carbon dioxide emissions or think about ways they can help less fortunate communities in the United States or abroad deal with some of the challenges of climate change. There are many ways your church can help address the issue of climate change, and your *Ecological Credo* will give you a theological grounding as you make decisions about whether, and how, to get involved.





National Council of Churches USA
Eco-Justice Program Office
110 Maryland Avenue, NE, Suite 108
Washington, DC 20002
www.nccecojustice.org
info@nccecojustice.org
202-544-2350