

ENVIRONMENTALISM

“cultivate it and keep it”

Key question

What is the responsibility of God’s people to the physical environment?

Key text

Psalm 24:1

“The earth is the Lord’s and all it contains, the world, and those who dwell in it.”

Introduction:

1. Environmental issues are not addressed in traditional Evangelical theologies and are seldom mentioned in works on Christian ethics but they have surfaced as important concerns in the last decade for a number of reasons.
 - a. The increased stress placed on the planet by growing human population and consumption of resources.
 - b. The growing sophistication of earth sciences and the subsequent awareness of the vulnerability of natural systems. Note: Environmental science is in its infancy and not nearly as precise as some activists would have us believe.
 - c. The political attention given to the environment. Environmental issues are enthusiastically funded and the competition for those funds tends to exaggerate the certainty of environmental science. Environmental science is vulnerable to political pressures.
 - d. Richard A. Baer says it well: “As Christians, we believe that the world and all that is in it is the deliberate, loving creation of God. He values it for its own sake as well as for its instrumental value to humans and to other creatures. And because he values nature, we, if we want to honor and serve him rightly, will also value it.” (<http://204.84.32.191/gsi/gsi-conf/discussion/baer.html>.) *Secular Bias and Environmental Policy: Giving Christians a Place at the Table*, a paper presented to the Global Stewardship Initiative Conference 1966.
2. Christianity has been criticized as a part of the problem in the current environmental challenge.
 - a. Some believe the Bible to be teaching a worldview that exalts humans at the expense of other species (and nature in general).
 - b. Christians have often been silent in the face of glaring ecological problems. The negative impact of a neglected environment on the human condition seems to be ignored by many Christian leaders.

3. There are two extremes that Christians should avoid.
 - a. **Pantheism** – the worship of nature. “For they exchanged the truth of God for a lie, and worshiped and served the creature rather than the Creator, who is blessed forever. Amen.” (Romans 1:25).
 - b. **Poor stewardship** of nature – failing to preserve the environment. This is often expressed in one of two ways. 1) The assumption that there really are not any serious environmental problems. 2) The assumption that the Bible says little or nothing about environmental issues. But we must note: “Then the Lord God took the man and put him into the Garden of Eden to cultivate it and keep it.” (Genesis 2:15).

A. The teaching of the Scripture on the subject of natural ecology.

1. **The Creation is subject to God.** The earth is not God and it is not eternal. “In the beginning God created the heavens and the earth.” (Genesis 1-2)
 - a. The creation bears witness to the Creator. Romans 1:20 “For since the creation of the world God’s invisible qualities – his eternal power and divine nature – have been clearly seen, being understood from what has been made, so that men are without excuse.”
 - b. Jesus calms the storm (Matthew 8:23-27, Mark 4:36-41, Luke 8:22-25). Jesus demonstrates God’s dominion over nature by *rebuking* the winds and the waves. The winds and waves *obeyed* him. He didn’t just work a magic spell, he directly interacted with Nature, and she obeyed. In Mark, he commands the waves “Quiet! Be still!”
 - c. **Psalms 104:25,30.** In wisdom you made them all, the earth is full of your creatures. There is the sea, vast and spacious, teeming with creatures beyond number - living things both large and small... When you send your Spirit, they are created and you renew the earth.”
2. We are to **fill and subdue the earth.**
 - a. Adam is to have dominion over the earth and the creatures on it. “Let us make man in our image, after our likeness,” says God in Genesis 1:26 “and let them have dominion over the fish of the sea, and over the birds of the air, and over the cattle, and over all the earth, and over every creeping thing that creeps upon the earth.”
 - The word used for dominion is the Hebrew *radah*, which means “tread down, subjugate, prevail against, rule over.” (Strong’s concordance)
 - Two verses later he instructs Adam and Eve: “Be fruitful and multiply and fill the earth and subdue it.” The word translated as subdue is the Hebrew *kabash*, which means to tread down, conquer, subjugate, violate, bring into bondage.
 - b. When God blesses Noah and his family after the flood, he says “The fear of you and the dread (*chath* – terror) of you shall be upon every beast of the earth, and upon every bird of the air, upon everything that creeps on the ground and all the fish of the sea; into your hand they are delivered.” (Genesis 9:1-4)
 - c. The world’s population grew slowly to about 250 million until the 200 years. Today it is at 6,500 million about 50 times what it was in the 18th century.
3. We are permitted to **consume from the earth.**
 - a. “Then God said, ‘Behold I have given you every plant yielding seed that is on the surface of tall the earth, and every tree which has fruit yielding seek; it shall be food for you; and to every beast of the earth and to every bird of the sky and to every thing that moves on the earth which has life, I have given every green plant for food’.” (Genesis 1:29-30).
It is clear that Adam was to consume in the sense of eating the plants.

- Later he would invite Noah to eat meat as well. (Genesis 9:3)
- b. The history of Israel illustrates the fact that humans were consumers of the earth's resources.
 - The Lord commands a fallow year for fields and vineyards every seven years (Leviticus 25:3-5).
 - Animals were to serve the purposes of man. The ox treads the grain (25:4); and all beasts of burden were to rest on the Sabbath (Exodus 20:10).
 - Animal sacrifices were a part of Israel's covenant with God (Leviticus)
4. We are to **cultivate and keep the earth.**
- a. "Then the Lord God took the man and put him into the Garden of Eden to cultivate it and keep it." (Genesis 2:15).
 The expression used for "cultivate and keep" is the Hebrew *le'obdah uleshomrah* meaning "keeping" in the sense of watching over or taking care of. It can also be rendered "worship and obey" and in this case would refer to Adam's relationship with God. The idea of "gardener" is in view more than "park ranger." Adam and Eve were to manipulate, change, prepare for use and consumption while at the same time protecting, preserving, and nurturing.
 - b. Proper respect and care for land and animals.
 - Fruit-bearing trees should not be cut down in siege warfare (Deuteronomy 20:19).
 - The Lord commands a fallow year for fields and vineyards every seven years (Leviticus 25:3-5).
 - People are required to help distressed animals (Deuteronomy 22:1-4); not to muzzle an ox when it treads the grain (25:4); and to allow beasts of burden to rest on the Sabbath (Exodus 20:10).
 - Protection of the vulnerable is important. "If a bird's nest chance to be before thee in the way in any tree, or on the ground, whether they be young ones, or eggs, and the mother sitting upon the young, or upon the eggs, you shall not take the mother with the young" (Deuteronomy 22:6)
 - Animal sacrifices - though common in the early days - are condemned by later prophets such as (Isaiah 66:3)
 - God expresses empathy for suffering in nature because of human sin. "How long shall the land mourn, and the herbs of every field wither, for the wickedness of them that dwell therein? The beasts are consumed, and the birds; because they said, He shall not see our last end." (Jeremiah 12:4)
 - According to the Old Testament law, we are to let our land rest every seven years, the 'Sabbath Year'. See Lev.25:1-7. If you want to really do it right, look at the next section – the Jubilee Year. Failure of the Hebrews to observe the Sabbath Year is seen in the length of time they were exiled from the Promised Land (70 years). See 2 Chr.36:21 and Jer.29:10. They had been in the land 490 years, not observing the 7th year as Sabbath (490/7 = 70 years 'taken' from the land).
5. **Humans are viewed as superior to animals and plants in the New Testament record.**
- a. There are no clear references in the New Testament addressing ecological responsibility.
 - b. Jesus made it clear that man was superior to the rest of creation.

- He gave examples of people watering their cattle, or of pulling their animals out of ditches, not to enjoin people to do these things, but to show that it must be alright to heal humans on the Sabbath. The implication is not that humans and animals are alike, but that humans are superior to animals: “And they asked him, saying, ‘Is it lawful to heal on the Sabbath days?’ that they might accuse him. And he said unto them, What man shall there be among you, that shall have one sheep, and if it fall into a pit on the Sabbath day, will he not lay hold on it, and lift it out? How much then is a man better than a sheep? Wherefore it is lawful to do well on the Sabbath days.” (Luke 14:11-12)
- Two of the most often cited images are used when Jesus is telling his disciples that they can follow him without concern about their food and clothing. If God has provided for animals, how much more will he provide for humans, who are more valuable. The full passages show that Jesus believed that God was aware of and took care of plants and animals. But he also clearly believed in human superiority over animals. “Look at the birds of the air: they neither sow nor reap nor gather into barns, and yet your heavenly father feeds them. Are you not of more value than they? Consider the lilies of the field, how they grow; they neither toil nor spin; yet I tell, you, even Solomon in all his glory was not arrayed like one of these. But if God so clothes the grass of the field, which today is alive and tomorrow is thrown into the oven, will he not much more clothe you?” (Matthew 6:26-30)
- The other quotation comes when Jesus is telling his disciples not to fear those who can kill the body but cannot kill the soul. “Are not two sparrows sold for a penny? And not one of them will fall to the ground without my Father’s will . . . Fear not, therefore; you are of more value than many sparrows.” (Matthew 10:29-31)

c. References to plants and animals by Jesus and Paul.

- **Cursing the fig tree.** “On the following day, when they came from Bethany, he was hungry. And seeing in the distance a fig tree in leaf, he went to see if he could find anything on it. When he came to it, he found nothing but leaves, for it was not the season for figs. And he said to it “May no-one ever eat fruit from you again” . . . And as they passed by in the morning, they saw the fig tree withered away to its roots. And Peter remembered and said to him, “Master, look! The fig tree which you cursed has withered.” (Mark 11:12-25)
- **Cursing the Gadarene swine.** Jesus saves the soul of two men possessed by a legion of demons, by casting the spirits into a herd of pigs innocently grazing nearby. The whole herd rush down the steep bank into the sea, and perish in the waters. (Matthew 8:28-32)
- **Paul’s reference to muzzling the ox.** For it is written in the Law of Moses, You shall not muzzle an ox when it is treading out the grain. Is it for the oxen that God is concerned? Does he not speak entirely for our sake? It was written for our sake, because the ploughman should plough in hope and the thresher thresh in hope of a share of the crop. (I Corinthians 9:9-10)

6. **This earth will one day be destroyed.**

- a. In the days of Noah, when humans turn out to be evil, God floods the whole earth and kills off every last animal and plant on earth except the specimens brought into the Ark: “And all flesh died that moved upon the earth, birds, cattle, beasts, all swarming creatures that swarm upon the earth, and every man; everything on the dry land in whose nostrils

was the breath of life died. He blotted out every living thing that was upon the face of the ground. (Genesis 7:21-23)

- b. To punish Sodom, God rained down brimstone and fire and razed the city to the ground, including the valley around it, and all the plants (Genesis 19:24- 25).
- c. In the plagues of Egypt God caused mass deaths of fish, horses, asses, camels, cattle and sheep. (Exodus chapters 7-9)
- d. The prophet Amos, who was active in Judah around 760 BC, devised another strand of God's environmental destructiveness: a future "Day of Yahweh" when God would wreak vengeance on the oppressors of the poor. The sun would go down at noon, and fire would devour the land and the oceans. Later prophets expanded Amos' vision. Isaiah threatened war and failed harvests. (Zephaniah 1:15-16):
- e. Jesus continued the Day of Yahweh tradition. The coming of the Son of Man would be preceded by the ominously named "birth-pangs." There would be famines and earthquakes and plagues, the sun would be darkened and the stars would fall from heaven. The earth would be flooded as in the days of Noah, while fire would rain from heaven as in the days of Lot. (Mark 13:14-25; Luke 17:22-37)
- f. Revelation completes the Biblical tradition, with a horrific vision of carnage and mass destruction. The sun becomes black as sackcloth, the sky vanishes like a scroll that is rolled up, and every mountain and island is removed from its place (6:12-14). When the seven angels blow their trumpets, hail and fire burn up a third of the earth, trees and grass, the sea becomes blood and a third of the fish die. A blazing star falls into the sea and turns a third of it bitter. All this is simply a warm-up for the Harvest of the Earth and the seven plagues, brought by angels who are told: "Go and pour out on the earth the seven bowls of the wrath of God." (16:1) The whole sea turns to blood and every living thing in it dies; all the rivers and springs turn to blood, and the river Euphrates is burned up. At the end of all this "the first heaven and the first earth had passed away, and the sea was no more." (21:1)
- g. II Peter 3:10-13 summarizes the transition with these words: "10But the day of the Lord will come like a thief, in which the heavens will pass away with a roar and the elements will be destroyed with intense heat, and the earth and its works will be burned up. 11Since all these things are to be destroyed in this way, what sort of people ought you to be in holy conduct and godliness, 12looking for and hastening the coming of the day of God, because of which the heavens will be destroyed by burning, and the elements will melt with intense heat! 13But according to His promise we are looking for new heavens and a new earth, in which righteousness dwells. 14Therefore, beloved, since you look for these things, be diligent to be found by Him in peace, spotless and blameless,"

7. God has a Relationship with All of His Creation.

- *Psalms 96:10-13*. The Lord reigns... Let the heavens rejoice, let the earth be glad, let the seas resound and all that is in it; let the fields be jubilant, and everything in them. Then all the trees of the forest will sing for joy, they will sing before the Lord for he comes, he comes to judge the earth.
- *Isaiah 43:20-21*. The wild animals honor me, the jackals and the owls, because I provide water in the desert and streams in the wasteland, to give drink to my people, my chosen.
- *Deut. 32:1-2*. Listen, Oh heavens, and I will speak, hear, Oh earth, the words of my mouth. Let my teaching fall like rain and my words descend like dew, like showers on new grass, like abundant rain on tender plants.

- *Job 37:14-18*. Listen to this, Job. Stop and consider God's wonders. Do you know how God controls the clouds and makes his lightning flash? Do you know how the clouds hang poised, those wonders of him who is perfect in knowledge?
- *Psalms 104:25, 27*. Animals, both small and great.. they all wait for thee to give them their food in due season.
- *Matt 6:26*. Look at the birds of the air, that they do not sow, neither do they reap, nor gather into barns and yet your heavenly father feeds them. And are you not worth much more than they?

8. **God's Power is Seen in Nature.**

- *Joshua 2:11*. For the lord your God is God in heaven above and on earth below.
- *Romans 1:20*. For since the creation of the world God's invisible qualities - his eternal power and divine nature - have been clearly seen, being understood from what has been made, so that men are without excuse.
- *Psalms 104:24*. How many are your works, O Lord! In wisdom have you made them all; the earth is full of your creatures. There is the sea, vast and spacious, teeming with creatures beyond number - living things both large and small.

9. **God Calls All of His Creation to Worship.**

- *Psalms 19:1*. The heavens are telling of the glory of God; and their expanse is declaring the work of His hands.
- *Isaiah 55:12-13*. The mountains and hills will burst into song before you, and all the trees of the field will clap their hands. All this will be a memorial for the Lord, a sign that for all time will not be cut off.
- *Nehemiah 9:6*. You made the heavens, even the highest heavens and all their starry host, the earth and all that is on it, the seas and all that is in them. You gave life to everything and the multitudes of heaven worship you.
- *Psalms 8:3-8*. When I consider your heavens, the work of your fingers, the moon and the stars which you have set in place, what is man that you are mindful of him, the son of man.
- *I Chron. 16:7,30-34*. Tremble before him, all the earth! The world is firmly established; it cannot be moved. Let the heavens rejoice. Let the earth be glad; let them say among the nations, "The lord reigns!"
- *Rev 5:13*. Then I heard every creature in heaven and on earth and under the earth and on the sea, and all that is in them, singing "To him who sits on the throne and to the Lamb, be praise and honor and glory and power for ever and ever."
- *Job 9:5-10*. But how can a mortal be righteous before God? Though no one wished to dispute with him, he could not answer him one time out of a thousand. His wisdom is profound, his power is vast. Who has resisted him and come out unscathed? He moves mountains without their knowing it and overturns them in his anger. He shakes the earth from its place and makes it pillars tremble. He speaks to the sun and it does not shine.

10. **God Teaches Humans through Nature.**

- *Job 12:7-10*. But ask the animals, and they will teach you; or birds of the air and they will tell you; or speak to the earth and it will teach you; or let the fish of the sea inform you. Which of all these does not know that the hand of the lord has done this. In his hand is the life of every creature and the breath of all mankind.

- *Romans 1:19-20*. For what can be known about God is plain to them, because God has shown it to them. Ever since the creation of the world his eternal power and divine nature, invisible though they are, have been understood and seen through the things he has made. So they are without excuse.
- *Isaiah 11:9*. They will neither harm nor destroy on all my holy mountain, for the earth will be full of the knowledge of the Lord as the waters cover the sea.

11. **God Expects Humans to be His Stewards over Nature.**

- *Genesis 1:26*. Then God said, "Let us make man in our image, and let them rule over the fish of the sea and the birds of the air, over the livestock, over all the earth and over all the creatures that move along the ground."
- *Lev. 25:23-24*. The land is mine and you are but aliens and my tenants. Throughout the country that you hold as a possession, you must provide for the redemption of the land.
- *Ezekiel 34:2-4*. Woe to the shepherds of Israel who only take care of themselves! Should not the shepherds take care of the flock? You eat the curds, clothe yourselves with the wool and slaughter the choice animals, but you did not take care of the flock! You have not strengthened the weak or healed the sick or bound up the injured. You have not brought back the strays or searched for the lost. You have ruled them harshly and brutally.
- *Ezekiel 34:10*. O shepherds, hear the word of the Lord. This is what the sovereign Lord says: I am against the shepherds and will hold them accountable for my flock.
- *Ezekiel 34:17-18*. As for you, my flock... Is it not enough for you to feed on good pasture? Must you also trample the rest of your pasture with your feet? Is it not enough for you to drink clear water? Must you also muddy the rest with your feet?
- *Isaiah 24:4-6*. The earth dries up and withers, the world languished and withers, the exalted of the earth languish. The earth lies under its inhabitants; for they have transgressed the laws, violated the statutes, and broken the everlasting covenant. Therefore a curse consumes the earth; its people must bear their guilt.
- *Jer. 2:7*. I brought you into a fertile land to eat its fruit and rich produce. But you came and defiled my land and you made my inheritance detestable.
- *Luke 16:2,10,13*. And he called him and said to him, "What is this I hear about you? Give an account of your stewardship, for you can no longer be steward. He who is faithful in a very little thing is faithful also in much; and he who is unrighteous in a very little thing is unrighteous in much. You cannot serve both God and mammon.
- *James 5:5*. You have lived luxuriously on the earth and led a life of wanton pleasure; you have fattened your hearts in a day of slaughter.
- *Mark 4:19*. ...and the worries of the world, and the deceitfulness of riches and the desires for other things enter in and choke the word and it becomes unfruitful.
- *Revelation 11:18*. The nations were angry and your wrath has come. The time has come for rewarding your servants the prophets and your saints and those who reverence your name, both small and great - and for destroying those who destroy the earth.

12. **The creation is a lens through which we are to see God and ourselves.**

- a. It reveals our basic dignity and goodness. The creation was deemed "good" in Gen.1. This included the creation of man which was deemed "very good."
- b. It reveals God's glory (Psalm 19:1, Rom.1:20) so that man is without excuse in his independent rebellion.

- c. It mirrors man's futility and suffering as he is alienated from God (Rom.8:18-25).
- d. It will not be renewed but replaced (II Pet.3:10-13) just as this fleshly body will be replaced in the resurrection (I Cor.15:50-53).

B. **Scientific pantheism's critique of Christianity and Environmentalism.**

1. Pantheism is the belief that the universe is divine and nature is sacred. It fuses religion and science, and concern for humans with concern for nature. It provides the most solid basis for environmental ethics. It is a religion that requires no faith other than common sense, no revelation other than open eyes and a mind open to evidence, no guru other than your own self.
2. A religion old or new, that stressed the magnificence of the universe as revealed by modern science, might be able to draw forth reserves of reverence and awe hardly tapped by the conventional faiths. Sooner or later, such a religion will emerge. *Carl Sagan, Pale Blue Dot (1994)*
3. Pantheists believe that "All religions must develop an ethic in which environment is central. To do so Judaism and Christianity must jettison the Genesis tradition of human dominion over nature, and the Apocalypse tradition of God as earth- destroyer. Christianity must search beyond the New Testament, which enjoins not one single environmental duty."

C. **The problem "of" and "with" Global warming**

1. Global Warming is controversial (in part) because the reliability of scientific climate prediction models is uncertain. There are two mistakes that we can make: 1) We may fail to respond to a true threat to our environment by not taking the indications of climate change seriously enough. 2) We may compromise valuable economic and social resources "countering" a problem that either does not exist or cannot be altered by our actions.

For a good general site on this subject see Wikipedia on Global warming controversy (http://en.wikipedia.org/wiki/Global_warming_controversy)

2. What are the facts that are not in dispute?
 - a. Globally averaged temperatures have risen by about 1 degree Fahrenheit since about 1900
 - b. CO₂ levels in the atmosphere are slowly increasing, very probably due to human activity.
 - c. CO₂ is a greenhouse gas.
 - d. Scientists who question the human connection to the problem and solution of global warming are often marginalized with comments like, "their work is funded by big oil companies who have a lot to lose if fossil fuels are restricted." In all fairness it might also be noted that those who hype the global warming issue are competing for grant funds that may be driven by "fad" or "political interests" other than pure search for the truth.
3. **The alarm over Global Warming** is well known and enjoys broad popular support. (Note Al Gore's *An Inconvenient Truth*). The alarm is expressed in the following points.
 - The earth is warming at a rapid rate. While there have been cycles of warming and cooling in the past, the present warming seems unusually dramatic and unnatural.
 - The effects of projected warming trend will be devastating to life as we know it - Sea levels will rise, storms will become more severe, animal species will be endangered, food supplies will be threatened, human migration and starvation will occur.
 - Human factors play a critical role in the warming trend. The burning of forests, and the consumption of energy from fossil fuels with the increased levels of CO₂ in the atmosphere are the big concerns.

- We have the ability to reverse or slow the Global Warming process through changed behavior. The cutting of CO₂ production through more conservative use of energy and the development of non fossil fuel sources is key.
 - The scientific experts in the field are in near unanimous agreement on the certainty of each of the above points.
4. **Problems with the Hypothesis.** Critics of the hypothesis argue that the global warming hypothesis is not scientifically verified. This is what some are saying:
- *“What scientists claim to know about manmade global warming is based as much upon faith as it is upon knowledge.” “Results of a survey of 530 climate scientists released by The Heartland Institute in May of 2007 revealed that only about one-half of the scientists agreed that “climate change is mostly the result of anthropogenic (man-made) causes.” Only one-third agreed that “climate models can accurately predict climate conditions in the future.” From Climate Confusion pp85 by Roy Spencer (principal research scientist at the University of Alabama and formerly Senior Scientist for Climate Studies at NASA)*
 - A video clip critical of Gore’s book
<http://youtube.com/watch?v=XDI2NVTYRXU>
 - About 60% of the temperature increase mentioned above occurred before 1940, but only 33% of the increase in carbon dioxide concentration had occurred by then. This suggests that increased carbon dioxide was not the critical or primary cause of the temperature increase.
 - The observed temperature rise is not accelerating: temperatures increased from 1880 to 1940, dropped slightly from 1940 to 1980, and have by some reports increased since then.
 - The reported increase since 1980 is not confirmed by satellites or air-borne measurements and may result from weather stations being close to urban areas. In fact, there is specific evidence that the reports of higher temperatures since 1980 by some sources reflect dishonest science.
 - National Geographic Societies “Naked Science” Discovery Channel Feb.7, 2008 noted that changes in global temperature are correlated with changes in solar activity. Solar magnetic flux shows trends similar to that for temperatures from 1880 to the present. *“The sun’s radiation has increased by 0.5% per decade since the late 1970s, while carbon output has waxed and waned with global recessions. If warming were caused by carbon output, you’d expect to see temps fall in slumps and rise in booms along with carbon output. Data show no such link. The Hoover Institution ran the numbers. “The effects of solar activity and volcanoes were impossible to miss. Temperatures fluctuated exactly as expected, and the pattern was so clear that, statistically, the odds of the correlation existing by chance were less than 1 in 100,” according to a study earlier this decade by Hoover fellow Bruce Berkowitz. “We simply could not find any relationship between industrial activity, energy consumption, and changes in global temperatures. We tried adjusting for delayed effects. We tried adjusting for cumulative effects. Nothing the relationship wasn’t there.” The study concluded that even if you completely shut down factories and power plants as Gore recommends “there would not be much effect on temperatures.”” Investor’s Business Daily posted 3/23/2007*
(See also junkscience.com/news/robinson.htm)

- Observations contradict the computer model predictions, indicating that the computer models are significantly exaggerating any potential warming. Also, the computer models are predicting smaller temperature increases than they did ten years ago, as they have become more sophisticated.
- The various predicted disastrous results of a temperature increase are doubtful, with different studies often making opposite predictions. Historically, however, civilizations have prospered in times of warmer climate. Various studies also indicate that plant life is prospering from the increased carbon dioxide levels.
- Any realistic corrective measures by man will probably not have a dramatic effect on climate change for at least 200 years if at all.
- Why would so many scientists sound the alarm with respect to global warming? Not all scientists agree on all the details. It has been noted that some of the scientists who question the global warming hypothesis have been funded by industries with a vested interest in the continued consumption of fossil fuels. It also must be noted that other scientists may have a vested interest that is rooted in the fact that funding of grants for their work is linked to the continued hype surrounding climate change and human activity. Politics and science are not always independent of one another. And this applies to all sides of any issue. *“One of the reasons why so many scientists believe current warmth is due to human emissions of carbon dioxide is simply due to the fact that the human emissions are known, while natural climate variability is, for the most part, unknown.”* *Climate Confusion* by Roy W. Spencer Pp82

These critics point out that we have not scientifically verified as a fact that mankind is causing a measurable increase in global temperatures. They say we should therefore wait for more evidence before we take actions that will cause immediate harm to people.

5. Greenhouse gases that effect global warming

- **Water H₂O** (1% atmospheric concentration) causes about 60% of Earth's naturally-occurring greenhouse effect.

This is by far the most potent greenhouse gas. Increasing 1% of water vapor in the atmosphere = an increase of 4 degrees Celsius in global temperature. Vladimir Shaidurov of the Russian Academy of Science believes that water vapor changes in the earth's atmosphere (over which humans have little control) are the primary cause of recent global temperature changes.

- **Methane CH₄**

Recent research has shown that this is the second most important factor in global temperature change. It is ten times more significant than CO₂ in effecting global warming. Methane is common in nature (from living and dead plants). Humans are directly or indirectly responsible for about 60% of the total atmospheric methane produced. The burning of vegetation makes up a significant part of the 60%. The production of livestock (cattle, sheep, etc.) makes up about 15% of the total anthropogenic contribution. Switching to a vegan diet may sound like a reasonable response but would no doubt be a hard sell in the U.S. and many other parts of the world. Data published by Dr. James Hansen and others show that CO₂ emissions are *not* the main cause of observed atmospheric warming. Though this may sound like the work of global warming skeptics, it isn't. Hansen is Director of NASA's Goddard Institute for Space Studies who has been called "a grandfather of the global warming theory." He is a longtime supporter of action against global warming, cited by Al Gore and often quoted by environmental organizations, who has argued against skeptics for subverting the scientific process. His results are generally accepted by global

warming experts, including bigwigs like Dr. James McCarthy, co-chair of the International Panel on Climate Change's Working Group II. (Earthsave.org/glovalwarming.htm) See also (www.sciencefriday.com/pages/1997/Dec/hour1_120597.html)

- **Carbon Dioxide** CO₂ (0.04% atmospheric concentration) carbon dioxide causes about 26% of Earth's naturally-occurring greenhouse effect.

“CO₂ concentration in the atmosphere is quite small, amounting to only 38 molecules of CO₂ for each 100,000 molecules of air. To those 38, mankind is adding about 1 molecule of CO₂ every five years or so. Only about 50% of what we produce ends up staying in the atmosphere. The rest is “missing” – presumably absorbed by the ocean and the biosphere, fertilizing plants and thus increasing vegetation growth rates around the world.” *Climate Confusion* by Roy W. Spencer Pp81

96% of CO₂ emissions come from nature (land and sea). Less than 4% of global emissions of CO₂ come from anthropogenic sources. Of that amount 23% are the result of deforestation. The industrialized countries produce about 49% (24% from U.S.) of the total anthropogenic sources. **Note that this means that the U.S. produces about 1% of the CO₂ in the atmosphere.** If we were to cut our production by 10%, which is what Gore suggests as workable, we would be able to reduce the CO₂ by 1/10th of 1%. No one can reasonably think that this will stop global warming. CO₂ has received a lot of attention because it is one of the areas that some people think we can control *Carbon Dioxide Information Center* (cdiac@ornl.gov)

Interesting facts about CO₂

- Of the 186 billion tons of CO₂ that enter earth's atmosphere each year from all sources, only 6 billion tons are from human activity. Approximately 90 billion tons come from biologic activity in earth's oceans and another 90 billion tons from such sources as volcanoes and decaying land plants.
 - At 368 parts per million CO₂ is a minor constituent of earth's atmosphere - less than 4/100ths of 1% of all gases present. Compared to former geologic times, earth's current atmosphere is CO₂- impoverished.
 - CO₂ is odorless, colorless, and tasteless. Plants absorb CO₂ and emit oxygen as a waste product. Humans and animals breathe oxygen and emit CO₂ as a waste product. Carbon dioxide is a nutrient, not a pollutant, and all life - plants and animals alike-- benefit from more of it. All life on earth is carbon-based and CO₂ is an essential ingredient. When plant-growers want to stimulate plant growth, they introduce more carbon dioxide.
 - CO₂ that goes into the atmosphere does not stay there but is continually recycled by terrestrial plant life and earth's oceans - the great retirement home for most terrestrial carbon dioxide.
- **Nitrous Oxide N₂O, Halocarbons and Other Gases (CO, O₃, NO, NO₂, SO₂)**
These elements are not as significant and are not as well understood as the big three above.
6. Some web sites that express concern about global warming and human factors that influence it.
 - A good general information site (<http://www.grida.no/climate/vital/intro.htm>)
 - **Environmental defense** (www.environmentaldefense.org/page.cfm?tagID=1011)
This site gives a concise list of myths and facts on the subject from the perspective of those who believe that global warming is a real threat and linked to human activity.

- **National Geographic news**
(http://news.nationalgeographic.com/news/2004/12/1206_041206_global_warming.html)
This site gives “fast facts” on the subject.
- **U.S. Environmental Protection Agency** (www.epa.gov/climatechange/)
This site offers a lot of material on the subject and links to other sources of information.
- **Skeptical Science – Getting skeptical about global warming skepticism**
(<http://www.skepticalscience.com/human-co2-smaller-than-natural-emissions-intermediate.htm>)

This site offers a response to skeptics of global warming.

7. Proponents of global warming claim that the scientific community is solidly behind the alarm being sounded, but there are some organizations disputing the science behind global warming. Many of them suggest that the greenhouse effect is not as serious as others report. Others suggest that the economic effects of mitigation efforts and emissions reductions are worse than allowing global warming to occur. It is important to recognize that the **seriousness** of the global warming **threat** is not an undisputed fact. These sites offer some information on the issue from a skeptical point of view. The point of including these sites is not to suggest anything other than there is not the kind of consensus that many would have us believe. There is room for ongoing debate.

- *A web site that offers a critique that summarizes the problems with global warming and links to other sites that raise concerns is* (www.look-to-the-skies.com/global_warming.htm)

- **geocraft.com/WVFossils/ice_ages.html**

This site is concise, with many helpful graphs, quotes, and facts that are not nearly as alarmist as the media suggests.

- **CO₂ Science Magazine** (www.co2science.org/)

“A weekly review and repository of scientific research pertaining to carbon dioxide and global change.” Managed by the Center for the Study of Carbon Dioxide and Global Change, a group critical of climate change claims. Information on the site includes data from the U.S. Historical Climatology Network, model experiments for measuring the effects of CO₂ on plants, along with journal and book reviews.

- **Global Warming Information Page** (www.globalwarming.org/)

The Cooler Heads Coalition is a subgroup of the National Consumer Coalition, and was founded by that group to “dispel the myths of global warming by exposing flawed economic, scientific, and risk analysis.” Features of the site include economic arguments against the Kyoto Protocol and other climate change policy documents as well as regular legislative updates.

- **New Scientist** (NewScientist.com) discusses many of the uncertainties at the heart of the scientific debate on global warming.

(www4.nationalacademies.org/onpi/webextra.nsf/web/climate?)

The Intergovernmental Panel on Climate Change (IPCC) concluded that global warming in the last 50 years is likely the result of increases in greenhouse gases, which accurately reflects the current thinking of the scientific community, the committee said. However, it also cautioned that uncertainties about this conclusion remain because of the level of natural variability inherent in the climate on time scales from decades to centuries, the questionable ability of models to simulate natural variability on such long time scales,

and the degree of confidence that can be placed on estimates of temperatures going back thousands of years based on evidence from tree rings or ice cores.

The report urges the establishment of a vigorous program of basic research to reduce uncertainties in future climate projections. In addition, a global observing system that monitors long-term climate predictions is needed.

- **Richard S. Lindzen** is the Alfred P. Sloan Professor of Meteorology at the Massachusetts Institute of Technology. He challenges the Global Warming Hysteria in *Global Warming: The Origin and Nature of the Alleged Scientific Consensus* (www.cato.org/pubs/regulation/reg15n2g)

In short he suggests that the scientific models used to predict climate change are not nearly as reliable as the media and the politicians would have us believe and that the hysteria created by activists may well be more damaging than the potential threat of “global warming.”

“Of course I believe in global warming, and in global cooling – all part of the natural climate changes that the Earth has experienced for billions of years, caused primarily by the cyclical variations in solar output,” said research physicist John W. Brosnahan, who develops remote-sensing instruments for atmospheric science for clients including the National Oceanic and Atmospheric Administration and NASA. However, he said, “I have not seen any sort of definitive, scientific link to man-made carbon dioxide as the root cause of the current global warming, only incomplete computer models that suggest that this might be the case. “Even though these computer climate models do not properly handle a number of important factors, including the role of precipitation as a temperature regulator, they are being (mis-) used to force a political agenda upon the U.S.,” he continued. “While there are any number of reasons to reduce carbon dioxide generation, to base any major fiscal policy on the role of carbon dioxide in climate change would be inappropriate and imprudent at best and potentially disastrous economic folly at the worst.”

- **Dr Bill Gray** (Emeritus Professor of Atmospheric Science at Colorado State University, and head of the Tropical Meteorology Project at CSU’s Department of Atmospheric Sciences) is perhaps the world’s foremost hurricane expert. His Tropical Storm Forecast sets the standard. Yet, his criticism of the global warming “hoax” makes him an outcast. He notes: “They’ve been brainwashing us for 20 years, Starting with the nuclear winter and now with the global warming. This scare will also run its course. In 15-20 years, we’ll look back and see what a hoax this was.”

Gray notes a 1975 Newsweek article that whipped up a different fear: a coming ice age. “Climatologists,” reads the piece, “are pessimistic that political leaders will take any positive action to compensate for the climatic change. ... The longer the planners delay, the more difficult will they find it to cope with climatic change once the results become grim reality.” Thank God they did nothing. Imagine how warm we’d be?

8. We need to be realistic concerning the facts of how our actions to reduce CO₂ in the atmosphere will impact the planet.
 - While we are in a position to politically lead the world in conservation efforts, we do not control the most damaging engines of CO₂ pollution. The emerging economies of China and India depend heavily on fossil fuel (coal) resources. The burning of forests in South America, represent about 1/3 of the total human CO₂ output of 4% on the planet.
 - Greenhouse gases that are related to human activity are relatively modest (less than 10%) when compared to the natural causes (water vapor, vegetation, etc.)

- All US cars and light trucks subject to CAFE (corporate average fuel economy) standards represent only 1.5% of worldwide man-made greenhouse gases. If proposed legislation to require a 40% increase in CAFE standards is enacted into law, the reduction in the car and light truck portion of global greenhouse gases would be virtually undetectable - only 0.4%, and not until 2010. *US EPA and Intergovernmental Panel on Climate Change* (ibiblio.org/rdu/gases.html)
 - The latent stores of CO₂ in the world's oceans will mean that it will be some 200 years before we will see any dramatic reversal of global warming even if we are successful in radical reversal of human CO₂ emissions. Rain runoff that flows into the oceans of the world, absorbs CO₂ and then release it into the air.
9. In spite of the controversy, it seems wise (for a number of reasons) to make changes in the way we treat our environment.
- a. Fossil fuels are limited, toxic to the environment, and stress international relationships. For these reasons we should work toward the development of alternative energy sources.
 - b. Unnecessary and wasteful use of energy should be stopped.