

Quaker Earthcare Witness

Earthcare for Friends

_____Unit 15_____

Economics and Earth Process

by Ed Dreby, with Keith Helmuth and Margaret Mansfield

Purposes of this unit

1. To show, using “ecological footprint” analysis, that the earth cannot sustain modern industrial economies in their current form.
2. To show that, without policy interventions, markets and money are apt to steadily increase the concentration of wealth, and cannot function within ecological limits.
3. To assert that progress toward peace, justice, and an Earth restored will require fundamental changes in our society’s economic policies and expectations, and that this needs to become a corporate concern of Friends.
4. To raise questions about an extremely complex and important subject, for which our society needs to find answers.

Sacred texts and other inspirational readings

If you lend money to my people, to the poor among you, you shall not deal with them as a creditor; you shall not exact interest from them.

—Exodus 22:25

“You wicked and slothful servant! Knew you that I reap where I have not sowed and gather where I have not winnowed? Then you ought to have invested my money with the bankers, and at my coming I should have received what was my own with interest. So take the talent from him, and give to him who has ten talents. For to everyone who has more will be given, and he will have an abundance; but from him who has not, even what he has will be taken away. And cast the worthless servant into the outer darkness....”

—Matthew 25:26–30

And again I tell you, it is easier for a camel to go through the eye of a needle than for a rich man to enter the kingdom of God.

—Matthew 23:24

...Render unto Caesar that which is Caesar’s and unto God that which is God’s.

—Luke 19:25

Luxury and covetousness, with numerous oppressions and other evils attending them, appeared very afflicting to me, and I felt, in that which is immutable, that the seeds of great calamity and desolation are sown and growing fast on this continent.

—John Woolman

Hymns and songs

Open My Eyes That I May See. *Worship in Song, a Friends Hymnal*, #166.

Once to Every Soul and Nation. *Worship in Song, a Friends Hymnal*, #273.

Issue presentation

_____Article 1_____

The Human Footprint and Friends Testimonies

IN 1968, the Apollo 8 astronauts took the first photographs of Earth from space and spoke of what it was like to see our planet from afar for the first time: "...a tiny, lovely, and fragile blue marble hanging in the blackness of space...." These photographs may come to be a symbolic if not pivotal event in modern society's evolving perception of the human-Earth relationship.

Quaker Kenneth Boulding is best known to Friends as author of *The Naylor Sonnets* and a proponent of peace studies. In the wider society Boulding was a prominent economist. He was among the first in his field to call attention to the limitations of existing economic concepts, for, because human enterprise had become global in scope, the earth had suddenly become much smaller and more fragile. As early as 1965, he wrote:

In the imagination of those who are sensitive to the realities of our era, the earth has become a spaceship, and this, perhaps, is the most important single fact of our day. For millennia, the earth in men's minds was flat and illimitable. Today, as a result of exploration, speed, and the explosion of scientific knowledge, Earth has become a tiny sphere, closed, limited, crowded, and hurtling through space to unknown destinations....

It is not only that man's image of the earth has changed; the reality of the world social system has changed. Earth has become a spaceship, not only in our imagination but also in the hard realities of the social, biological, and physical system in which man is enmeshed. In what we might call the "old days," when man was small in numbers and Earth was large, he could pollute it with impunity, though even then he frequently destroyed his immediate environment and had to move on to a new spot, which he then proceeded to destroy.

Now man can no longer do this; he must live in the whole system, in which he must recycle his wastes and really face up to the problem of the increase in material entropy which his activities create.... Man is finally going to have to face the fact that he is a biological system living in an ecological system, and that his survival power is going to depend on his developing symbiotic relationships of a closed-cycle character with all the other elements and populations of the world of ecological systems.

Two centuries earlier, the spiritual and ethical insights of another Friend, John Woolman, reached a level that we would call ecological understanding. He observed the physical and spiritual harm that came from economic exploitation: to the exploiter as well as to the people, animals, and land being exploited. He saw "the seeds of great calamity" embedded in the pursuit of wealth and power, and in the economic institutions through which these ends were pursued:

Wealth desired for its own sake obstructs the increase of virtue, and large possessions in the hands of selfish men have a bad tendency, for by their means too small a number of people are employed in things useful; and therefore they, or some of them, are necessitated to labour too hard, while others would want business to earn their bread were not employments invented which, having no real use, serve only to please the vain mind....

Woolman's views were dramatically opposite to those of moral philosopher Adam Smith, who published *The Wealth of Nations* a few years after Woolman's death. In his analysis of the free market system, Smith maintained that the collective actions of individuals acting in their self-interest serve the best interests of society as a whole. In so doing, he launched the study of economics as an emerging discipline.

The evolution of economics as a discipline has in many respects paralleled the evolution of the economic institutions it studies—of markets, private property, money, banking, corporations, and government. These institutions developed in tandem with new technologies based on the advances of science, which led to the evolution of industrial civilization.

The benefits of industrial culture have been truly stunning. Over the past two centuries, industrialization has provided many people with better food and health; a much higher standard of living; and opportunities for the cultivation of individual and societal talent, creativity, and fulfillment. But these benefits have come at great cost to many other people. They have also brought about a more rapid conversion of the earth from an “empty illimitable space” to a “full small sphere,” in which human activities tend to be disruptive of the totality of interrelated systems that we call “Earth process.”

It is almost 40 years since Boulding identified the need to adapt our society and economy to a smaller and more crowded Earth. Many people are now aware that human economies are interfering with Earth process. Policies have been developed to “protect” the environment, but only a few economists have begun to consider what must be done to fit the now global economy into a limited biosphere. Unlike Boulding, most economists and public officials assume that what worked in the past will solve the problems we face today.

There are now two clear and related trends in the human-human and human-Earth relationship:

- ❖ Activities that damage the earth’s ecological integrity continue to expand, and environmental disruption, social breakdown, and threats to the health of humans and other species increase.
- ❖ Financial wealth and claims to the earth’s resources are concentrating in the possession of the already wealthy, while the conditions of life steadily worsen for many impoverished people.

The conventional wisdom that now guides much of economic policy lacks a coherent approach for dealing with either of these related realities.

WHAT IS IT that makes economics a matter of spiritual concern? Economic activity has become an all-encompassing web of relationships. As such, it is a place of continuous spiritual, as well as material, exchange. Our spiritual traditions teach us, above all else, that God is present in relationships. The quality of all our relationships, and of compassion and justice in economic life is vital to the deepest impulses of our faith. This is most obvious in the area of service work, where the quality of what is done is highly related to the quality of the relationships among the people involved. If we take right relationship as the ethical standard of our spiritual tradition, then economic behavior, policies, and institutions are squarely within the circle of spiritual concern.

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If it is difficult to see the connection to the life of the spirit in a concern for economics, it may help to ask a simple question about the human-Earth relationship: “What does the Creator really have in mind?” Doesn’t it simply mean, “What kind of economics would nurture the integrity and resilience of the whole of life as God creates it?” If scientifically oriented economists would not pursue this question as phrased, doesn’t that illustrate why we need to bring the religious and ethical perspective into the study and practice of economics?

In 1996, the Earthcare Working Group (EWG) of Philadelphia Yearly Meeting came to clearness and unity of purpose that has guided our work to the present: advancing a Friends’ witness on ecology and public policy to help transform our society’s human-Earth relationship. From the beginning we knew that “...simplicity is not enough” because current economic policy is at odds with ecological sustainability. But we were also clear about the need to first ground our broader concern within the Yearly Meeting.

As we became involved with Friends Committee on National Legislation (FCNL), we discovered that FCNL’s witness for peace and justice often tends to stop short of economic policy. One of us who once asked a question was admonished by a seasoned member of the FCNL General Committee, “Friends do not agree on economics.” Yet, if economics is a hinge issue for peace, justice, and transforming the human-Earth relationship, Friends need to enable FCNL to deal with economic policies.

Then, at EWG's first meeting after the terrorist attacks of September 11, 2001, it came to us, almost as an epiphany, that whether or not we were well enough grounded within the Yearly Meeting, advancing a specific concern for economics could wait no longer. We are now moving forward in collaboration with Quaker Eco-Witness for National Legislation (QEW-NL), a project of Quaker Earthcare Witness. A six-to-eight session curriculum, Quaker Eco-101: Exploring Economics and Friends Testimonies in an Ecological Context, is in preparation to serve as a tool for churches, Meetings, and others. We hope you will use it as the "next step" beyond this unit in considering what Friends should be doing about economic policies in light of our Testimonies.

Illustrative activity for Article 1

Our Ecological Footprint

by Ed Dreby and Hollister Knowlton

(Based on *Our Ecological Footprint, Reducing Human Impact on the Earth*, by Mathis Wackernagel and William Rees. 1996. New Catalyst Bioregional Series, New Society Publishers, Gabriola Island, B.C.)

Purpose

To illustrate the trends of a) increasing pressures on ecosystems and b) extremes of wealth and poverty, by comparing differing lifestyles in terms of the total amount of the earth's surface and biological production that is appropriated to support them.

Definition

An "Ecological Footprint" [*see Unit 8 for the Ecological Footprint Quiz*] is a rough estimate of the amount of land that a person would need to support a particular lifestyle if all the food and water, shelter, possessions, energy, and other resources, including the recycling of wastes, were to be supplied by one contiguous parcel of land.

Explanation

This idea, first used by William Rees and more fully developed by his student Mathis Wackernagel, is to determine how much biologically productive land area is needed to supply all the resources and absorb all the wastes generated on a continuing basis by a particular population or lifestyle. Although a population occupies a territory, it uses resources from all over the world. The ecological footprint is the combined size of these areas, wherever they may be on the planet. The idea was first applied to a *region*. For example, the region that includes Vancouver, B.C., where the concept was initially developed, uses resources requiring *19 times* as much land as the region itself. London, which is more densely populated, would need a land area *200 times* the size of the city. The per-capita footprint is calculated by dividing the size of the population into the total land area required to supply it.

Wackernagel, Rees, and their colleagues have now calculated per-capita "ecological footprints" for numerous *cities* and *countries*, based on the total number of people and total consumption of goods and services. "Ecological footprints" can also be used as a way to illustrate the relationship between the *total human use of the earth's resources* and the *earth's carrying*

capacity, as well as *what an equitable distribution of the earth's resources would be*.

There is currently enough land for each human to use the goods and services provided by 4.5 acres.

How much are we humans actually using? Who is using how much? How do Friends testimonies relate to these questions?

How much usable land is there? What is the "fair share"?

THE TOTAL SURFACE AREA of the earth is a known quantity—approximately 126 billion acres. The exposed land surface area is roughly 36 billion acres. Subtracting for land that is desert, built- over, paved, or covered by ice or fresh

water, about *28.5 billion acres* remain available to share.

With 6½ billion humans, if we were to share equally (on a sustainable basis, with no space provided exclusively for wildlife) there is currently enough land for each human to use the goods and services provided by 4.5 acres. How much are we humans actually using? Who is using how much?

How do Friends testimonies relate to these questions?

In addition to the calculations that have been done for various cities, regions, and nations, you can calculate your own footprint at two different web sites: <<http://www.earthday.net/footprint/index.asp>> and <<http://www.lead.org/leadnet/footprint>>. Remember that an ecological footprint is a rough approximation, not a rigorous measure, and that the size of a particular person's ecological footprint is determined by a combination of personal decisions made by individuals, and societal decisions over which individuals have little control.

Ecological Footprint Exercise

Preparing for the exercise and discussion

- ❖ Using the chart below, prepare enough index cards for the group (unless it is too large).
- ❖ Prepare one card for “World Average” (5.7 acres) and for “Fair Share” (4.5 acres).
- ❖ On the other cards, write the name of a country, and the average per-capita ecological footprint. Paperclip one piece of scrap paper for each acre to the card (8½ x 11 is a good size). With a small group, be sure to include at least the cards for World Average, Fair Share, U.S., Germany, China, and Mozambique. (Persons given cards with small footprints can receive multiple cards).

Average Per-Capita Ecological Footprint, by Country from Redefining Progress, Ecological Footprint Accounts, 2002, < http://www.redefiningprogress.org >			
United States	24 acres	Mexico	6.0 acres
Norway	20 acres	Turkey	4.9 acres
Canada	17 acres	Thailand	4.2 acres
Australia	17 acres	Egypt	4.0 acres
U.K.	14 acres	China	3.9 acres
Austria	14 acres	Ecuador	4.0 acres
France	13 acres	Philippines	3.2 acres
Germany	12 acres	India	1.9 acres
Spain	12 acres	Bangladesh	1.4 acres
Switzerland	11 acres	Mozambique	0.5 acres
World Average—5.7 acres		Fair Share—4.5 acres	

- ❖ Read with participants the definition of ecological footprint. Review the concept and where the figure of 28.5 billion acres comes from. Show them the paper and explain that one sheet equals 1 acre. Sheets can be folded to approximate partial acres.
- ❖ Give each participant a card. Ask them to lay out the paper—edge to edge—to represent the “footprint” of the country card they are given, and then stand by it.
- ❖ When they are ready, point to various participants and ask them to introduce themselves (by country) and tell their ecological footprint size. Save World Average and Fair Share for the end.
- ❖ Ask participants for observations and thoughts. If they need prompting, ask:

Questions

1. What do you notice about the Fair Share versus the World Average?
2. Which countries are using less than the Fair Share?
3. Why is the U.S. average so high?
4. Are there ways we can reduce our ecological footprint?
5. What do our Quaker Testimonies tell us about this situation?

Some key points

- ❖ It would take about 1¼ Earths to sustain the existing human ecological footprint.
- ❖ It would take more than 2 Earths to sustain all 6½ billion humans if the per-person ecological footprint becomes the average in industrialized nations.
- ❖ It would take more than 3 Earths to sustain all 6½ billion humans if the per-person ecological footprint becomes the average in the U.S.
- ❖ The difference between the U.S. average and the industrialized nation average is primarily because of the greater per-person use of energy in the U.S.
- ❖ Differences in the sizes of the ecological footprints within nations are comparable to the differences between nations.
- ❖ As the human population grows, the Fair Share necessarily becomes smaller.
- ❖ As the size of the human economy grows, the World Average becomes larger.

_____Article 2_____

Modern Economies and Earth Process

AS STATED IN ARTICLE 1 and illustrated by the Ecological Footprint Exercise, there are two dysfunctional trends occurring in today's increasingly globalized economy:

- ❖ The expansion of human economic activities is damaging more ecosystems, regionally and globally.
- ❖ The extremes of wealth and impoverishment are increasing.

While economic expansion has a direct and obvious effect on ecosystems and resources, so does impoverishment and excessive wealth. Both contribute to violent conflicts, which in turn devastate ecosystems. If one considers cause and effect, concerns for peace, social justice, protection of the earth, and an economics of Earth stewardship and right sharing are all intertwined.

Elements of an economic system

TO CONSIDER these trends in more detail, it is important to identify several distinct elements of any modern economy:

Markets

A simple definition of a market is the process of exchange of money for a particular kind of good or service between many buyers and sellers. If there are many buyers and sellers, prices are apt to be only as high as necessary to provide a fair return to the sellers. Most people no longer make most things for themselves. For this reason, it is essential that markets function—that exchanges keep taking place—the society to prosper. In a modern industrial economy there are a huge number of markets. In addition to markets for goods and services, there are markets for land, labor, savings, and a great many different kinds of financial securities.

Capital

A simple definition of capital is wealth used to increase the ability to produce. What economists mean by physical capital, or real capital, is the tools, machinery, factories, trucks, roads, and stores that make it possible for goods and services to be provided through markets to people who want them. Economists distinguish physical capital from financial capital. Some economists also identify natural and social capital as elements of the economic system that need to be given more consideration.

Investment

A simple definition of what economists mean by an investment is spending for new physical capital: a new tool, machine, factory, truck, road, or store. If the investment is successful, there

Economics and Earth Process

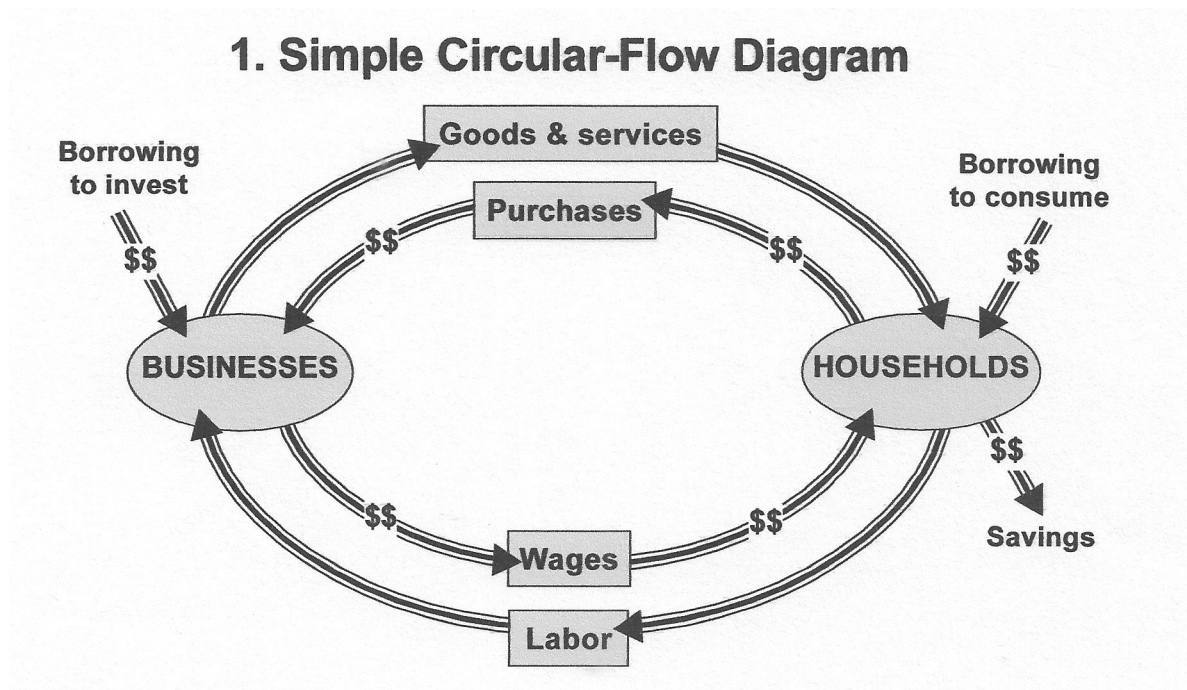
will be an increase in the goods or services provided by markets to people who want them, and a profit for the investor. To an economist, financial capital is savings invested in physical capital.

Interest

A simple definition of interest is money that a borrower pays a lender in exchange for being able to use the borrowed money. When someone puts savings in a bank to earn interest, they are actually lending it to the bank. The business of the bank is to lend the money to someone else who is willing to pay a higher rate of interest on debt, some of which goes to the depositor and the rest of which goes to the bank.

Why do modern economies tend to expand?

THERE ARE MANY EXPLANATIONS for the expansion of industrial economies, and for the sense that prosperity is at risk if they don't expand. There is controversy among economists about the usefulness of various explanations. But there are two reasons for expansion that are basic to the system itself. One is that both producers and governments tend to promote new investment to maintain market activity. The other is that borrowers need to expand their earnings to pay interest on their loans. These reasons are most easily explained in the context of the Simple Circular Flow Diagram that is included in every introductory economics textbook.



Promoting investment to maintain market activity

WHEN PEOPLE DECIDE to save part of their income instead of spending it for goods and services, the savings are withheld from markets, at least temporarily. This is illustrated by the Figure 1, the Simple Circular Flow Diagram. If savings are deposited in banks, which lend them to other households for consumption and/or to businesses for investment, the money is returned to the circular flow and used for the purchases of consumable and/or capital goods and services.

However, if savings are withheld from the banking system, or not loaned by the banking system for spending, the level of demand for goods and services will decline. This may result in a downward spiral of declining production, employment, income, and purchases. It is one of the reasons there is so much impetus, by governments to encourage businesses to borrow for investment, and by both businesses and government to encourage consumers to borrow for consumption.

Increasing earnings to pay interest

WHEN SAVINGS ARE USED in a way that earns interest, they are returned to the system by the borrower, who must then do something to pay back the loan plus the interest. If the borrower is a household, members of the household must earn more money in the future than they did in the past to pay off the debt. If the borrower is a business and the loan is used to buy new capital equipment, increased production from the equipment must provide the earnings to pay off the debt.

Either way, the need to pay back loans plus interest creates pressures for economic activity to expand, and *most new production is apt to expand the economy's use of energy and material resources.*

Do all economies have to expand?

IT WOULD CERTAINLY be possible to devise economic policies so that savings can be used for investment and other purposes without driving economic expansion. Many people think of the free enterprise system as a monolithic entity. In reality, every modern economy uses a distinctive variety of ways to make four basic types of decisions.

The four types of decisions are:

1. How much labor, capital, and resources from land are used to produce how much of what kinds of goods and service?

Three interacting ways can be readily distinguished:

- ❖ By markets, i.e., by voluntary exchange at a price by private parties as buyers and sellers.
- ❖ By intentional planning, i.e., by a public agency or cartel dealing with the workings of the economy.
- ❖ By dissociated fiat, i.e., by an executive, legislative, judicial, or non-governmental decision made for other reasons, to which the economy must adjust.

2. Who owns and profits from the society's physical capital, its "means of production"?

Three general forms can be readily distinguished:

- ❖ Ownership tied to the ownership of land, the basis for feudalism.
- ❖ Private for-profit ownership by individuals, partnerships, corporations, or cooperatives.
- ❖ Ownership by public entities such as a community or a nation.

3. How is money created and managed?

Three ways, among others, can be distinguished:

- ❖ Most modern money is created by banks when they credit accounts with new loans (debt) on which interest is paid to the banking system.
- ❖ Money can be created directly by governments, and its creation can be unrelated to earning interest, as with coinage minted and bills printed and circulated by governments.
- ❖ Local currencies, created by community groups, are being successfully used in Canada, the United States, and many other countries.

4. How are decisions made about the economy's legal framework and management?

These can be made at different levels, by different processes, and for different purposes, as in:

- ❖ At the community, regional, national, or global level.
- ❖ By executive, administrative, judicial, legislative, or electoral process.
- ❖ Based on priorities involving considerations such as: a) the interests of financial investors, producers, employees, and consumers, b) differences in income, age, and responsibility, and c) protection of human and ecosystem health.

By identifying these separate types of decisions, and the variety of ways they are made in modern economies, a variety of considerations that often come wrapped in a single package can be unbundled. How each affects the economy as a whole can then be considered separately. Using a single label like “capitalist” or “socialist” to characterize a society or a viewpoint does little to promote understanding of the way that a system actually works, or how markets might be changed to function differently.

The role of government

EVERY GOVERNMENT has policies that affect the distribution of income and wealth. Some policies accentuate the tendency for wealth to accumulate; others moderate this tendency or may even counterbalance it. However, *no government of an industrialized country is trying to redesign its economic system to function within ecological limits*. People in industrial societies expect to earn a high return on their savings, and this simply isn’t possible unless the economy expands. Furthermore, in the globalized economy, no government would be apt to succeed in redesigning its economy unless all governments were to do it together.

Perhaps one reason that so many people expect to earn high returns on their savings, and don’t consider the effect this will have on the earth, is that we tend to see the economy as illustrated by the Simple Circular Flow Diagram on page 175, *and the earth is simply missing from this model*. All the diagram shows are the markets, as though, to use Boulding’s phrase, the resources from land come from, an illimitable Earth.

The need for a different understanding of the economy

AN EMERGING FIELD of *ecological economics* uses a different model, presented in Article 3, that places the economy in *a larger context of the society and the earth*. This model incorporates many *other kinds of capital* that provide resources for producing goods and services.

Corporations are now concerned about having international agreements to protect their property rights in intellectual capital: the new knowledge they

have paid to develop. Ecological economists also identify other kinds of capital, including: *a) Natural capital* (natural resources and eco-system services), *b) Human capital* (knowledge and skills of individuals), and *c) Social capital* (social order provided by families, communities, and civil society). These are shown in the diagram of Economics in its Ecological and Social Context on page 183.

They each provide flows of material and/or energy into the market economy, and receive flows of material and/or energy back from the market economy in different forms. Some of these flows are recognized by the market system and are included to some degree in prices. Others are not. Some of these flows help maintain the productivity of the capital stock that provides them. Increasingly, many do not.

It is fairly easy to understand that if an economic system is to prosper, its stock of *physical capital*—its tools, machines, factories, trucks, roads and stores—*must be maintained or replaced*. A company that begins selling its machinery without replacing it, that begins to “liquidate” its capital stock, will produce fewer goods and services. Its ability to receive income from its capital stock will surely decline.

Ecological economists observe that *this is also true of natural and social capital*. If the ability of the natural and social capital stock to provide resources to the economy is not maintained, the economy will decline. At present, *economic theory views natural and social capital as “externalities,”* which means they are external to the market system and not a part of the models on which most economic theory is based. Policies can be devised to “account” for these stocks as part of the whole economy, and to be sure that they are maintained and protected by the economic system

Many economists have yet to embrace the idea that natural and social capital need to be



Our modern way of life has been based on the assumption that the environment is part of the economy. We are now realizing this assumption is an error and that the human economy is actually a part of the environment—a wholly owned subsidiary of Earth's biosphere.

fully integrated into economic models. Many political leaders, and the public at large, are concerned about dealing with social and environmental problems. But *few people think about the need to invest in the economy's natural and social capital as an alternative way of understanding the causes of social and environmental problems.* One thing is certain: If an economic system continues to expand, and doesn't concern itself with maintaining and protecting the stocks of natural and social capital as well as the man-made capital on which it depends, sooner or later it will go out of business.

Modern economics is based on the assumption that the environment is part of the economy. *We are now realizing this assumption is an error.* The human economy is actually a part of the environment—a wholly owned subsidiary of Earth's biosphere. This recognition creates a profound upheaval in our understanding of the human-Earth relationship and in our relationship with the Creator.

Our relationship with the Creator is closer than we previously imagined. We are not dealing with "an ancient of days" that once long ago set the life of Earth in motion, but rather with *the continuous emergence, manifestation, and unfolding of the Creator in the midst of Earth's communities of life.* This understanding of relationship goes to the core of human identity within Creation. Adapting our economics to the requirements of respecting and protecting all life is a matter of deep spiritual significance and religious responsibility. Human economic and social life is inseparable from the integrity of Creation, and this insight brings *the ethic of Earth stewardship* into clear focus.

Illustrative activity for Article 2

The King and the Wiseperson: Exponential Growth in Mathematics and Human Societies

Preparing for the exercise and discussion

Materials needed

- ❖ Chessboard
- ❖ Pint container full of unpopped popcorn
- ❖ 1-oz. medicine cup or 1/8-cup coffee scoop
- ❖ Lid to pint container or similar lid

Set-up

Put the chessboard on a table where people can gather to see it. Fill the medicine cup with popcorn, and put some kernels in the lid. Put the medicine cup and pint container in the middle of the chessboard, and put the lid to the side. To understand the square numbers on the chessboard, consider the upper-left square to be Square 1 and then count across to the right, down a row and back to the left down a row and back across to the right and so forth. Recruit a narrator, a wise person, and a servant. You be the king.

Exercise

Narrator A simple example of exponential growth, and how it can surprise us even when we understand its possibilities, is a story told of the ancient wise man who invented chess. The king was so pleased with the game that he wanted to reward the wise man

handsomely, and asked him to choose anything in the kingdom he wanted.

The wise man knew the king's people were hungry and that the king was selfish, so he decided to trick the king to help the people. All he wanted, he said, was a grain of rice on the first square to be doubled on the second, doubled again on the third, and so on for each square on the board. The king couldn't believe the wise man would ask for so little, so tried to get him to ask for something more. But the wise man said he was offered whatever he wanted, this was all he wanted, and he knew the king was a man of his word. So the king ordered a servant to bring a basket of rice and to begin counting out the reward.

King This is a wonderful game. How can it be that this is all you want as a reward? You can have gold—or a palace of your own—anything! (Wise person ad lib _____)
Okay, you silly wise person, have it your way. Servant! Bring rice and give him/her his/her reward. Put one kernel on Square 1, two kernels on Square 2, four kernels on Square 3, eight kernels on Square 4. (Ad-lib as led, and on Square 4 say, "Come on! Hurry up! We don't have all day!")

Stop the servant in the middle of Square 5 and ask people to guess which squares the medicine cup (9) and pint container (13) go on. Refer to the numbers at the end of this unit, and let them sink in.

Discussion of exponential growth

- ❖ Refer to the information in the box about Pax World Balanced Fund, a "socially responsible" fund that many Friends are familiar with (and in which the authors have invested their savings). Note that the fund's performance since 1983 is such that if all earnings were reinvested, every \$1 invested in 1983 would now be \$3.
- ❖ Ask what the effect is apt to be if a large number of people have savings that increase in this way? When they decide to spend their savings, where would all the additional goods and services come from that they can now buy?

Questions

1. What does this suggest about the effect that compound interest has on the distribution of wealth in the national and global economies? On the ecological damage caused by human activities?
2. How long can the amount of savings invested at compound interest increase before the system becomes destabilized? How long can governments manage the system to keep it functioning without a major crisis? How big does a crisis have to be before it becomes major?
3. If enough people voluntarily reduce the amount of gasoline they buy to lower the price of gasoline, how might other people respond? How might businesses respond?
4. If a lot of people voluntarily reduce the amount of everything they buy, how might other people respond? How might businesses respond?

Pax World Balanced Fund

Average annual total returns
as of June 30, 2003

1 year	3.07%
3 year average	2.66%
5 year average	4.18%
10 year average	9.59%
15 year average	10.17%
20 year average	10.40%

A quick rule of thumb for estimating how many years it takes for invested money receiving compound interest to double, then double again, is to divide the rate of interest into 70.

From PAX World Fund
Semi-Annual Report
Fall, 2003

Query

What do our Quaker testimonies tell us about unlimited growth?

Note: If people seem to be overwhelmed by these issues, you may want to read together the section on “Ways Forward” in Article 3, followed by a time for reflection and discussion or worship-sharing.

Article 3

Cycles and Growth in Nature and Human Economies

THE EARTH is for all practical purposes *a closed and limited physical system*. It receives energy from the sun and radiates energy into space. Except for occasional meteorites and rockets, no physical material either enters or leaves the earth.

God’s miracle of life has used the sun’s energy to create increasingly complex communities of life that interact with one another and with the earth itself in self-sustaining and transforming ways. Water circulates throughout ecosystems, as do carbon, nitrogen, oxygen, and all the other physical constituents of the ecosphere. While the law of the jungle—and of modern corporations—may be “eat or be eaten,” the law of self-sustaining life is “eat *and* be eaten,” which is to say that everything is recycled. Life is sacrificed so that new life can be created. Every critter’s wastes and remains become some other critter’s food.

Everything either remains in balance over time, or changes over time, until a balance is created. That evolving life has participated in creating a resilient and evolving balance on Earth over several

billion years is part of God’s timeless miracle. *What sacrilege could be greater than to knowingly participate in the unraveling of the fabric of life without trying to stop what is happening?*

Growth and adaptation in nature

LIFE’S CAPACITY for self-reproduction entails an inherent potential for population growth. It also entails a contrasting potential, on which life’s survival depends, for adapting to environmental limitations and participating in complex ecosystems. Single-cell organisms that reproduce by cell division double their numbers with every generation. Repeated doublings enable populations of bacteria, for example, to expand very quickly, almost explosively—an example of what mathematicians refer to as “*exponential growth*.” Limitations of habitat, usually the availability of food, control the population by balancing the reproduction of some by the death of others. Otherwise, the expanding population may crash to extinction or decline to survive in a smaller ecological niche.

The potential for exponential growth of single-cell organisms appears to have transformed the nature of life on Earth at least twice. The first time was a population explosion of organisms that excreted carbon dioxide and over time created an atmosphere in which carbon dioxide was the dominant gas. The second time was a population explosion of organisms that evolved to consume carbon dioxide and excrete oxygen, thus creating an atmosphere with an increasing amount of oxygen. Still newer organisms then evolved, with multiple cells and increasing complexity: organisms that consume oxygen and excrete carbon dioxide, and thus a chemically and thermodynamically stable atmosphere was created. Many of these new complex creatures reproduced sexually. (See Unit 17 for a more detailed explanation.)

Sexual reproduction provides for greater genetic diversity and for evolution by natural selection through the differential production of offspring. The combination of *genetic diversity* (every critter’s body and behavior is not quite the same as any other’s) and *differential production* of offspring (the genes of those who produce more offspring are more prevalent in shaping the bodies and behavior of the next generation) enables species to adapt to changing environments and to co-evolve with other species. It also provides for possibilities that two parents may have one, two, five, seven, or hundreds of offspring as part of the means by which populations of

While the law of the jungle—and of modern corporations—may be “eat or be eaten,” the law of self-sustaining life is “eat *and* be eaten,”

various creatures and their overlapping habitats maintain balance over time.

Growth and adaptation in human culture

CULTURE has enabled humans to transcend the limitations of specific habitats—at least for a time.

Like life itself, culture offers potentials for both exponential growth and sustainable balance. While many simple cultures seem to

have developed a sustainable balance with their surrounding ecosystems over long periods of time, complex civilizations generally have not developed such an ecological balance. Instead they have become weakened—through expansion, gradual degradation of their land, or both—leading to collapse, conquest, and/or migration to a new location.

Today we see the physical expansion of human enterprise without any consideration of ecological balance. With no “empty places” left to settle, we face the limitations of the global habitat. Any list of environmental problems points to an underlying ecological reality: Industrial societies not only fail to participate in complex ecosystems, but are causing their disintegration and destruction. We can see characteristics of exponential growth not only in human numbers, but also in the quantity of human artifacts, our consumables and possessions, the machines we use to make them, and the volume of money we create.

Clearly the human population cannot continue to grow forever. Nor can the amount of land humans use or the number of houses or cars or roads or factories we build. Between 1920 and the present, world population has tripled. During this same period, U.S. paper consumption has increased 12-fold with all of the environmental impacts this entails. Both population and the use of energy and resources continue to increase. However, the population growth rate is declining, while public policies continue to promote economic expansion as a solution to our problems, i.e. “growing the economy.” Earning high rates of return on savings has become an expectation to which most citizens believe they are entitled.

While many simple cultures seem to have developed a sustainable balance with their surrounding ecosystems over long periods of time, complex civilizations generally have not.

Illustrative activity for Article 3

AS DISCUSSED EARLIER in this unit, over the past 200 years the economic institutions and policies of industrialized societies have evolved in ways that promote economic expansion. This places increasing pressure on natural resources, while ignoring the inherent limits of those resources. Many people are aware of serious social and environmental problems that are related to economic growth, but few people are integrating ecological realities into their economic thinking.

Question for discussion

COMPARE THE TWO DIAGRAMS, the Enhanced Circular Flow, and Economics in its Ecological and Social Context on pages 182 and 183. What observations can you make about their similarities and differences? What questions do the similarities and differences raise for you?

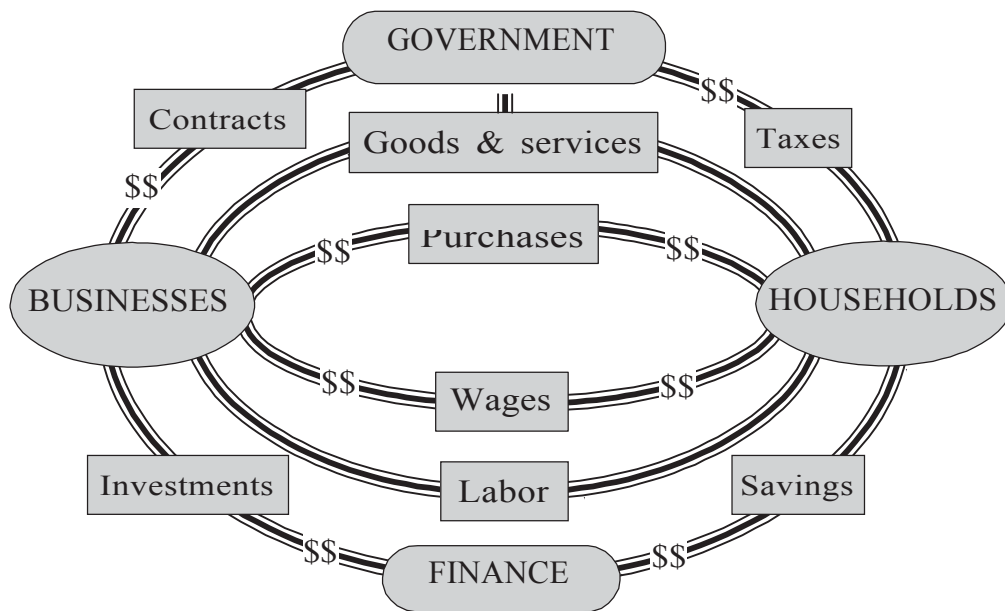
Specific questions and key points about the “Enhanced Circular Flow”

1. Ask what the arrows represent.
2. Note that the role of government and finance is included in the circular flow, but there is nothing in it about national debt and international trade and investment. Ask how

national debt and international trade and investment might affect the circular flow.

3. Note that there is nothing in the diagram that shows energy or material resources coming into the circular flow, or that shows anything leaving it.
 - a. Explain that the *biosphere* is that part of the atmosphere and the earth inhabited by life, and the *lithosphere* is the earth's crust below the level inhabited by life.

2. Enhanced Circular-Flow Diagram

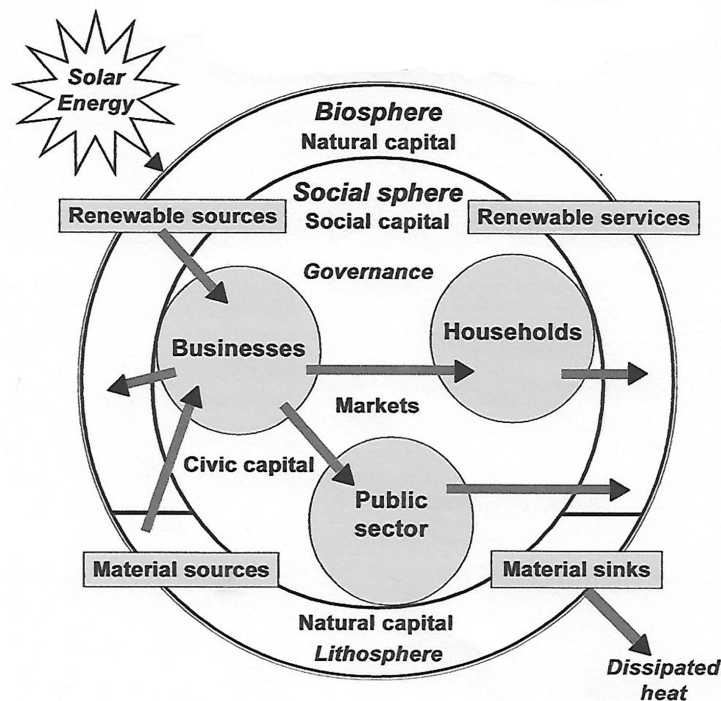


- b. Ask what economic activities can increase without causing a direct or indirect increase in the flow of concentrated energy and/or material from the biosphere or lithosphere into the system and of dissipated energy and/or material back into the biosphere?
4. Remind Friends that trends toward expansion are an inherent part of the system in its present form. Ask what happens to the earth as economic activity expands.

Specific questions and key points about “Economics in its Ecological and Social Context”

1. Ask what the arrows represent.
2. Note that solar energy flows into the biosphere and that dissipated heat flows out of it. Ask the following questions:
 - a. What happens if less energy flows out of the biosphere than comes into it?
 - b. Why might this happen?
 - c. If material sources from the lithosphere are added to the biosphere and are used for energy, what might happen?
3. Note the following points:
 - a. The flow of solar energy is, on a human scale, constant and fixed.
 - b. There is a limit to how much solar energy can be captured and concentrated, and that energy must be used to capture and concentrate energy.
 - c. If human economies must eventually run on solar energy, we need to think of economic efficiency as energy efficiency, i.e., using ingenuity and technology to do as much work (concentrating energy and materials) as possible with as little energy as possible.
4. Note that material flows from the biosphere and lithosphere into the social sphere and from the social sphere into the biosphere. Ask the following questions:

3. Economics in its Ecological and Social Context



- a. What happens if the material flows from the lithosphere are returned to the biosphere rather than to the lithosphere?
 - b. Is a landfill part of the lithosphere or of the biosphere? (Refer to the definition of biosphere and lithosphere if necessary.)
 - c. What material is returned from the biosphere to the lithosphere or the biosphere?
5. Note the following points:
- a. There may be a lot of material resources in the lithosphere—ores, minerals, oil, and coal—but that, for the most part, they can be removed only once.
 - b. The resources that are easiest to get are taken first, so that as more are used increasing amounts of energy are required to obtain them.
6. Note that the material resources from the biosphere have the possibility of regenerating themselves, so that humans can use them on a continuing, or sustainable, basis. Ask:
- a. What conditions are needed if these resources are to be available on a continuing basis?
 - b. What might lead the future supply of renewable resources to be diminished?
 - c. What might be done to increase the future supply?
7. Note the following points:
- a. The more materials can be recycled within the social sphere, the less material will be needed from the lithosphere, and the less dissipated material from the lithosphere will be introduced into the biosphere.

- b. In nature, every creature's wastes and remains are another creature's resource, and that the production of goods and services can be designed to copy nature.
 - c. If material resources are limited, we need to think of economic productivity as resource productivity, i.e. using ingenuity and technology to keep them recycling in the social sphere as long as possible.
 - d. We need to return material to the biosphere only in forms and amounts that can be recycled by renewable services.
8. Note that the diagram of Economics in its Social and Ecological Context on page 183 does not show flows of money, in part because, from an ecological perspective, the systems needs to function (as it is currently not functioning) so that the incentives of money:
- a. Maximize energy efficiency and resource productivity.
 - b. Minimize the use of material resources from the lithosphere, and
 - c. Limit the use of energy to the solar supply and the use of renewable resources to their regenerative capacity or sustainable yield.



Ask whether Friends have ideas about:

- a. How money incentives might maximize energy efficiency, resource productivity, and living within limits that protect the regenerative capacity of renewable resources.
 - b. How money incentives might be used to invest in natural capital.
9. Note that social capital involves beliefs, values, motivations, skills, and knowledge that create social order and enable people to thrive in families, communities, and economies. Ask how market activities relate to the uses, the maintenance, and the increase or depletion of social capital, and specifically of human capital (individual qualities) and civic capital (effective governance).

Key points about both diagrams

Neither diagram considers:

- a. How goods, services, and money produced by economies are distributed among members of societies.
- b. How the earth's nonrenewable resources are distributed among present and future generations.
- c. How the earth's limited supplies of renewable energy and material resources should be distributed among human and non-human populations.

Questions for reflection

- ❖ Why is simplicity in lifestyle not enough to bring human activities into balance with Earth process?
- ❖ How can the governance of markets and money be developed so that human economies use as little energy and material as possible, and maintain the stocks of natural and social capital, or even increase these stocks?
- ❖ Why is it that the American Friends Service Committee, Friends Committee on National Legislation, and other Friends organizations find dealing with economic issues to be difficult?
- ❖ Why are there many differences of opinions among Friends about economics, and why do Friends so rarely talk with one another about these differences?
- ❖ What do Friends need to learn more about, as individuals and as communities, in order to come to clearer understanding and greater unity about how economic policies work?
- ❖ How can we integrate concerns for relevant economic policies with our witness for peace, justice, and an Earth restored?

Challenges and ways forward

AT WHAT POINT will the physical expansion of human economies, as well as the policies and institutions that drive expansion, become recognized as a fundamental ecological problem? It is truly challenging to consider the evidence that the basic ways that markets and money currently function may underlie the damages humans are inflicting on Earth process. It is painful in the extreme to think of the possibility that things we have been taught to do for ourselves, for our loved ones, and for society as a whole are part of the problem.

This realization can be truly overwhelming. It can also take us back to the spiritual roots of our faith, to the conviction that if we but ask, individually and corporately, the Spirit will lead us forward and ways will open. We also may find helpful the ideas of three religious leaders, known to many Friends, about acknowledging and moving beyond pain and despair to hopeful and faithful engagement:

- ❖ Joanna Macy (Buddhist author and activist) suggests that only if we open ourselves to the full extent of the devastation that is occurring, and allow ourselves to experience the pain of being open to it, we will be able to move beyond pain to meaningful action.
- ❖ Thomas Berry (Catholic priest and scholar) cautions against thinking that our environmental problems are caused by evil people. While there will always be evil people, our predicament comes as a result of a great many good people who have been doing a very good job of what they are expected to do.
- ❖ John Cobb (Methodist minister and theologian), when asked about the prospects for the future, responded that he was not optimistic, but that he was *hopeful*— because he believes in miracles: With God's guidance, human beings who are faithful can do what may seem impossible. We need only to ask God for help to be faithful to our understanding of what we must do, so that the miracle may happen.

There are many ways forward that people are already engaged with, and that need to be supported. These include technologies associated with sustainable agriculture, sustainable design, and sustainable energy, and policies involving tax-shifting, tradable permits, and mandatory recycling of products by their manufacturer.

An essential step is to focus on how changes in our economic policies can open doors to the future without negating the efforts, accomplishments, and sacrifices that have already been made. The emerging field of ecological economics is developing models and analytic tools to integrate human economies with Earth process. The diagram of Economics in its Social and Ecological Context illustrates some features of these models. A central task of public policy is to engage our society's full energies and best minds in developing these models and tools, and bringing their possibilities to fruition.

We believe Friends have an opportunity, as we have at earlier times in our history, to be a witness for truth that will help make possible an essential transformation in humanity's understanding of our place on God's Earth, our home. Only through such a transformation in understanding can progress be made toward a society grounded more fully in the collective spiritual consciousness that Jesus embodied and taught. ❖

Prayers and responsive readings

O God of all creation, enlarge my heart and enlarge the hearts of my fellows with such a tenderness for all creation that we shall dare to speak up for all our fellow creatures and for the precious natural world that sustains them.

—Douglas Steere, 1966 Pendle Hill Pamphlet

Prayer in the Contemporary World

Leader	<i>The high, the low, all of creation, God Gives to human kind to use.</i>
All	Praise be to God.
Leader	<i>If this privilege is misused, God's Justice permits creation to punish humanity.</i>
All	Praise be to God.
Leader	<i>With nature's help humankind can set into creation all that is necessary and life sustaining.</i>
All	Praise be to God.
Leader	<i>God's majesty is glorified in the manifestation of every manner of nature's fruitfulness</i>
All	Praise be to God.
Leader	<i>This is possible, possible through the right and holy utilization of the earth, The earth in which humankind has its source.</i>
All	Praise be to God.
Leader	<i>The sum total of Heaven and Earth, everything in nature, is thus won to use and purpose.</i>
All	Praise be to God.
Leader	It becomes a temple and altar for the service of God.
All	Praise be to God.
Leader	<i>God has arranged all things in the world in consideration of everything else.</i>
All	Praise be to God.
Leader	<i>All nature is at the disposal of humankind. We are to work with it. Without it we cannot survive.</i>
All	Praise be to God.
Leader	<i>I have my home on high, I meet every creature of the world with grace.</i>
All	Praise be to God.
Leader	<i>God desires that all the world be pure in his sight. The earth should not be injured. The earth should not be destroyed.</i>
All	Praise be to God.

—Adapted from Hildegard of Bingen

Answers to the “King and the Wise Person” exercise from page 179:

Square 9: Pill cup with 256 kernels.

Square 17: Trash can with more than 32,000 kernels.

Square 25: 1,000-gallon tank with more than 8,000,000 kernels.

Square 64: 200 trillion 55-gallon barrels, with more than 10 quintillion kernels!

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Other resources

- ❖ *Quaker Eco-101: Exploring Economics and Friends Testimonies*, a six-session curriculum for Friends churches, meetings and other groups. It is intended to help Friends gain a clearer understanding of the relationships among markets, money, and government policies, of differing perspectives about economic models and policies, and of issues and opportunities to consider. It includes a number of articles by Friends, and a more extensive bibliography. See <<http://www.QuakerEarthcare.org>>, or contact Ed Dreby at 609/261-8190.
- ❖ Quaker Eco-Bulletin, published bimonthly by Quaker Eco-Witness in National Policy, is distributed by e-mail, and with *BeFriending Creation*. See <<http://www.QuakerEarthcare.org>>.
- ❖ Work in progress: *Of Human Wealth: Beyond Greed and Scarcity*, by Bernard A. Lietaer and Stephen M. Belgin. For advance ordering information write: HWBT@accessfoundation.org.