Macroeconomic Measurement:

Environmental and Social Dimensions

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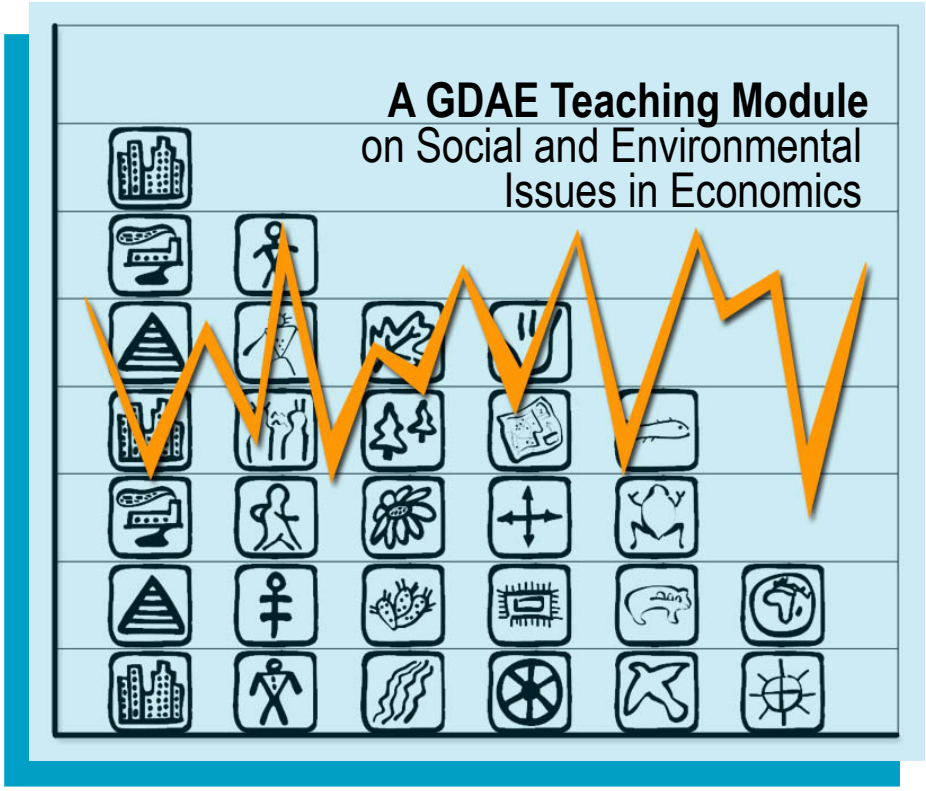

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This module is based on Chapter 6 from:
Macroeconomics in Context, First Edition

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Macroeconomic Measurement: Environmental and Social Dimensions

With the increasing need to recognize issues of ecological and social sustainability, many economists have in recent decades examined the question of how national accounting--and macroeconomic analysis based on such accounts--can be improved. As economist William D. Nordhaus, chair of a blue-ribbon National Research Council panel, put it in a 1999 report to the U.S. Bureau of Economic Analysis:

> Over the last quarter century, we have become increasingly aware of the interactions between human societies and the natural environment in which they thrive and upon which they depend…The idea of including environmental assets and services in the national economic accounts is part of a larger movement to develop broader social and environmental indicators. This movement reflects the reality that economic and social welfare does not stop at the market's border, but extends to many nonmarket activities.
>
> ("The Future of Environmental and Augmented National Accounts," *Survey of Current Business*, November 1999, p. 45)

1. New Understandings for the 21st Century

The traditional macroeconomic model portrays a hypothetical economy in which only businesses engage in production, and in which the natural environment plays no role. Increasingly, however, people have raised questions about whether this gives an adequate picture of the macroeconomy.

People have come to realize that economic activity actually takes place within the context of human social institutions which in turn are inextricably embedded in the natural environment. This embeddedness is illustrated by the outer rings labeled "Social Context" and "Physical Context" in Figure 1. In addition, the contributions to production of households and community groups (within the core sphere), and of non-profit as well as government institutions (within the public purpose sphere) have recently received more attention, as illustrated in the center of Figure 1. Of course, the role of businesses, both foreign and domestic, is recognized in both the traditional and newer approaches.

Many researchers argue that national governments need to start gathering new kinds of data in order to face the challenges of 21st century concerns. Building on these new kinds of information, some researchers are concentrating on developing refined measures of national assets and production, keeping as close as possible to the framework of the National Income and Product Accounts (NIPA). In Sections 2 and 3 of this reading, we discuss the two major areas in which improvements in data gathering and possibly in the design of national accounts seem to be most badly needed: accounting for the environment and accounting for unpaid work in households.

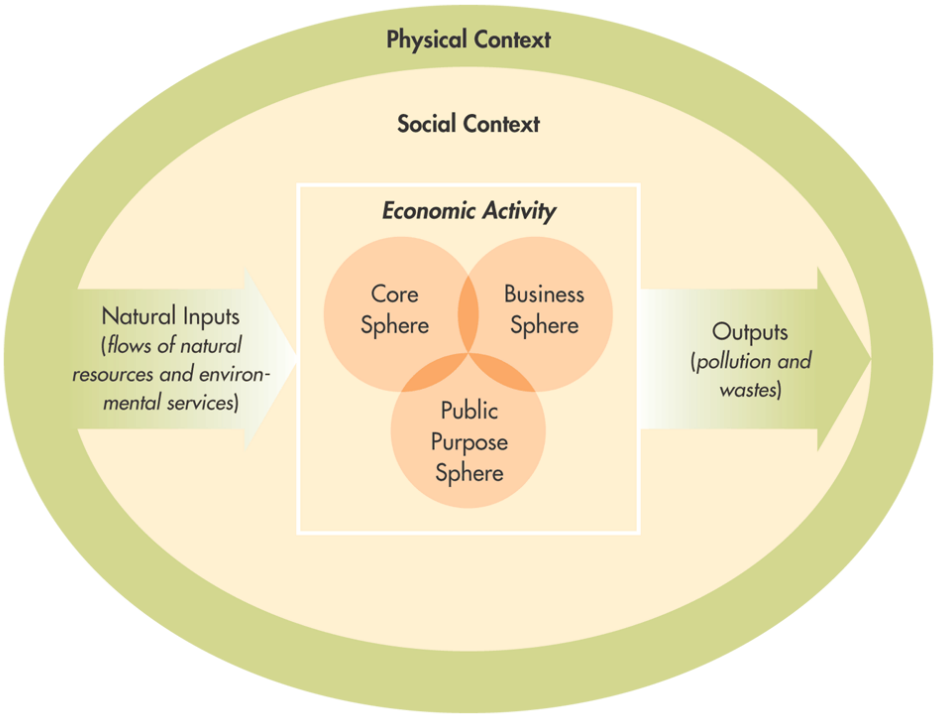

Figure 1. Macroeconomics in Context
An emerging understanding of macroeconomic performance notes that businesses (both foreign and domestic), households and communities (the core sphere) and public purpose institutions (governments and non-profit organizations) are all involved in the productive activities. Economies are, in turn, embedded in a context of larger social institutions and the natural (physical) environment.

Other researchers make it their aim to design indicators that more directly measure social and economic well-being. Rather than seeking to measure the volume of *production*, these researchers seek to develop indicators of the *quality of life*. This is the subject of Section 4 of this reading.[1]

Discussion Questions

1. GDP can be characterized as a (rough) measure of the amount of "throughput" going on in an economy—as measuring the level of activity whose purpose it is to turn renewable and non-renewable resources into new products. How does "throughput" relate to sustainable well-being? Is more "throughput" always a good thing?

2. Economies are based on natural capital (physical assets provided by nature), manufactured capital (physical assets generated by human productive activities applied to

[1] While there has been active discussion in recent years about what kinds of economic *measurement* could help us get to a more flourishing, sustainable economy, somewhat less progress has been made to date on improving macroeconomic *modeling* to take into account 21st century concerns.

natural capital), social capital (trust, mutual understanding, shared values, and socially held knowledge) and human capital (people's capacity for labor and their individual knowledge and skills). Only the value of manufactured capital (structures and equipment)--and recently, software--is estimated in the current national accounts. Can you think of ways that the stocks of natural, social, and human capital might be measured? What kind of information would be needed?

2. Accounting for the Environment

The natural environment plays roles that are indispensable to economic life. Environmental economists describe these under the headings of three functions:

1. **Resource functions:** the natural environment provides natural resources that are inputs into human production processes. These include such things as mineral ores, crude petroleum, fish, and forests. Some of these resources, such as fish and forests, are renewable while others, such as minerals and petroleum, are not.

2. **Environmental service functions:** the natural environment provides the basic habitat of clean air, drinkable water, and suitable climate that directly support all forms of life on the planet. Water filtration provided by wetlands and erosion control provided by tree-covered hillsides are other examples of services provided by ecosystems. People enjoy the services of the natural environment directly when they enjoy pleasant scenery or outdoor recreation.

3. **Sink functions:** the natural environment serves as a "sink" which absorbs (up to a point) the pollution and wastes generated by economic activity. Car exhaust dissipates into the atmosphere, for example, while used packaging goes into landfills and fluid industrial wastes end up in rivers and oceans. Some wastes break down relatively quickly into harmless substances. Others are toxic and/or accumulate over time, eventually compromising the quality of the environment.

The way in which the natural environment provides the resources and environmental services that sustain economic activity is illustrated by the arrow on the left in Figure 1, showing inflows into economic activity. The way in which economic activity puts waste products into environmental sinks is illustrated by the arrow on the right in Figure 1, showing the economy generating flows back into the environment.

> The three main ways in which the environment interacts with the economy are through resource functions, environmental service functions, and sink functions.

> **resource functions**: the provision by the natural environment of inputs into human production processes

> **environmental service functions:** the provision by the natural environment of the ecosystem services that support and enhance life

sink functions: the provision by the natural environment of places to put waste materials

While for centuries these three environmental functions were treated as though they were provided "free" and in unlimited amounts, more recently the problems of depletion of resources, degradation of environmental services, and overuse of environmental sink functions have become increasingly apparent. (See the accompanying News in Context box.)

News in Context: Commercial Fleets Reduced Big Fish by 90%, Study Says

(by Andrew C. Revkin, *The New York Times*, May 15, 2003)

In just 50 years, the global spread of industrial-scale commercial fishing has cut by 90 percent the oceans' population of large predatory fishes, from majestic giants like blue marlin to staples like cod, a new study has found.

Oceanographers not connected with the study say it provides the best evidence yet that recent fish harvests have been sustained at high levels only because fleets have sought and heavily exploited ever more distant fish populations… The study, drawing on decades of data from fishing fleets and research boats, paints a 50-year portrait of fish populations under siege as advances like sonar and satellite positioning systems allowed fleets to home in on pockets of abundance… In almost all exploited areas, it generally took just 10 or 15 years for populations to crash. One measure was fish caught per 100 hooks on the Japanese lines. The study said the rate went from 10 fish per 100 hooks to 1 or less in that period (see Figure 2).

"This shows that the reason we've had so much tuna and swordfish, the only reason this has been sustained, is because boats kept going farther and farther away," said Dr. Jeremy B. C. Jackson, a professor at the Scripps Institution of Oceanography. Dr. Jackson has conducted other studies showing declines and ecological effects in coastal waters but was not involved in the new work. "The problem now is there's no place left to go," he said. "There are a lot of people out there willing to fish the last fish. But that's just not going to work."

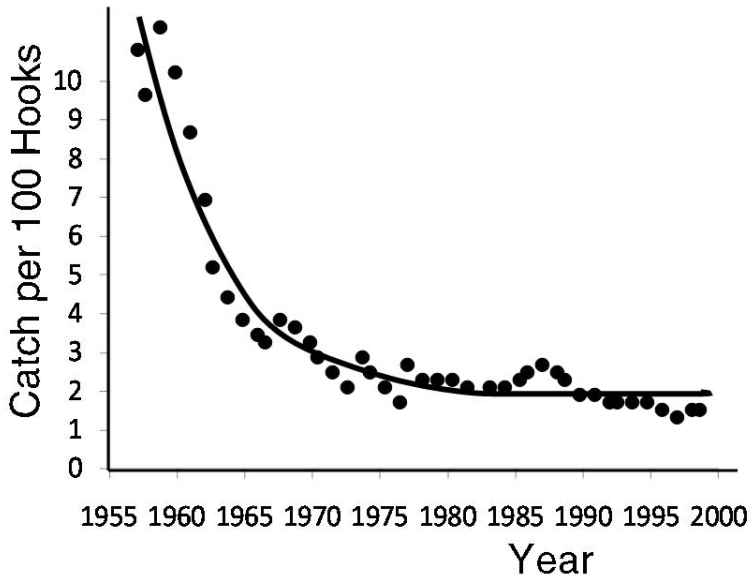

Figure 2. Time Trends of Community Biomass of Large Predatory Fishes in Various Ecosystems

The spread of industrial-scale commercial fishing has seriously depleted the oceans' populations of large fish.

(Source: "Rapid worldwide depletion of predatory fish communities" by Ransom A. Myers & Boris Worm *Nature* 423, May 15, 2003, Table 1)

Which sort of environmental function is discussed in this news article? Why did fish appear to be in "limitless" supply for so long, in spite of the depletion of specific fisheries?

2.1 Physical Accounts

A first step towards accounting for the environment is simply to attempt to quantify some of the major environmental effects of economic activity in physical terms, such as in terms of proportions of fish stocks lost or tons of coal burned.

Many governments have already committed in principle to creating such accounts for their own nation, at least on one issue of major concern. The burning of fossil fuels and the resulting release of carbon dioxide into the atmosphere has been scientifically linked to global changes in climate that may, if not halted, have catastrophic results within the next few decades. In 1997 the Kyoto Protocol on Greenhouse Gas Emissions was drafted. It aims to reduce climate-change-causing greenhouse gas emissions (like that of CO_2) to 5 to 7 percent below 1990 levels by 2012. Individual goals were set for different countries. By mid-2007, 175 parties, including most industrialized countries such as Canada, United Kingdom, France, Germany, Italy, Spain, Switzerland, Sweden,

Norway, Japan, the Republic of Korea, and New Zealand (as well as many less industrialized countries including China and Mexico) had ratified the agreement.

Of course, for a country to know if it is complying with its promise, it needs to know what its how many tons of greenhouse gasses it released into the atmosphere in 1990 and how many tons it is releasing currently. The gathering of scientific and economic information necessary to measure such environmental variables, aggregated to a national level, is thus a new and expanding field.

2.2 Natural Assets and the National Accounts

The Bureau of Economic Analysis currently counts only manufactured assets in its tables of national assets, and only investment in manufactured assets in its calculation of investment (and savings). The 1999 National Research Council report pointed out that:

> Natural resources such as petroleum, minerals, clean water, and fertile soils are assets of the economy in much the same way as are computers, homes, and trucks. An important part of the economic picture is therefore missing if natural assets are omitted in creating the national balance sheet. Likewise, consuming stocks of valuable subsoil assets such as fossil fuels or water or cutting first-growth forests is just as much a drawdown on the national wealth as is consuming aboveground stocks of wheat, cutting commercially managed forests, or driving a truck.
>
> (*Nature's Numbers: Expanding the National Income Accounts to Include the Environment*, National Research Council, 1999, pp. 19-20)

In principle, then, this panel concluded, the value of a nation's natural resources should be added to the value of its manufactured capital stock in accounting for national assets.

Measures of the natural capital stock of a country should also include the value of assets related to environmental service and sink functions. An old-growth forest, for example, not only provides timber resources, but also environmental services such as water retention, habitat provision, and carbon sequestering, as well as recreational and esthetic value. Ideally, then, tables in the national accounts that look at a country's assets should be much expanded.

Asset tables measure *stock* values. That is, the value of assets is measured as of a point in time. But more importantly, perhaps, for immediate policy purposes, is the issue of taking into account *changes* in the level of national environmental assets. When, over the course of a year, nonrenewable resources are depleted, or the environment's capacities to provide service flows or function as an effective sink are degraded, the nation's ability to produce in the future is reduced. The natural capital stock has depreciated. This is a *flow* variable. The amount of "disinvestment" that occurs is measured over the course of a year.

In concept, then, whenever the depreciation of manufactured capital is subtracted in the national accounts, *depreciation of natural capital* should be subtracted as well. For example, the 2003 version of the United Nations System of Integrated Environmental and Economic Accounts discusses a measure called **environmentally adjusted net domestic product (eaNDP)**, or GDP less both these kinds of depreciation.

eaNDP = *GDP*
– *Depreciation of manufactured capital*
– *Depreciation of natural capital*

This measure should more accurately reflect the full picture of production and depreciation in a given year.

> **environmentally adjusted net domestic product (eaNDP**): suggested by the United Nations, this is equal to GDP less depreciation of both manufactured and natural capital.

Similarly, The World Bank in 1995 proposed that saving less both kinds of depreciation be called **Genuine Saving**:

Genuine saving = *(Gross) Saving*
– *Depreciation of manufactured capital*
– *Depreciation of natural capital*

Under standard measures of net saving, a country only needs to save a little more than the amount it needs to replace its worn out manufactured capital in order to appear to be saving for the future. The genuine saving measure points out that countries that run down their natural capital may be making things worse for the future, even if their manufactured investment seems to be keeping a healthy pace.

> **genuine saving:** proposed by the World Bank, this is equal to gross saving less depreciation of both manufactured and natural capital

2.3 National Accounts and What Nature Produces

The adjustments we just discussed relate to the asset or *stock* value of natural assets, and how the value of these assets can depreciate over time. But, you might have noticed, in calculating eaNDP we started with the traditional measure of the *flow of production* over a year, GDP. Should we also adjust the measures of the flow of national production to account for environmental factors? Should GDP itself be "environmentally adjusted"?

In an ideal accounting system, we might think of the natural environment as yet another productive sphere or sector. The ecosystem, unless severely disturbed, generates over the course of any year such goods and services as new plants in forests and fields, new livestock and fish, clean air and water, spectacular scenery, an amazing diversity of

plant and animal species, and services such as protection from solar radiation —often without any effort on the part of humans. Many of these natural processes add to human well-being, and humans could not survive and flourish without them. In theory, then, accounts of production relevant to human well-being should include all the flows of new goods and services that nature generates.

Most economists agree, however, that compiling comprehensive accounts for *all* that nature does for us over the course of a year would be an over-ambitious task. In fact, for productive flows as for stocks of assets, what we really want to know about for policy purposes are the ways that the *economy and environment interact*, particularly when this interaction leads to undesirable outcomes.

For example, suppose a hillside is stripped of its forest covering, and the wood is sold as pulp for papermaking. The lack of vegetation now means that run-off from rain increases and a town downstream from the hillside suffers flooding and has to repair many buildings. Even if the vegetation should grow back by the end of the year, something has happened.[2] In the national accounts as currently constructed, the logging activity contributes to GDP in this year (in the form of valuable wood products) *and* the activity of repairing buildings is counted as an economic activity that *also* adds to GDP in this year. It would seem that the more damage we do to the environment, the more "productive" the economy is!

Or consider an alternative scenario, in which the town realizes that flooding is likely, and fills sandbags to line its riverbank. It thereby avoids costly repairs. But, again, both the logging and the sandbag-making are counted as adding to GDP.

What is wrong with this, of course, is that the initial environmental services of the forest in terms of water retention were not counted as part of GDP. If they had been, we would have noticed that the efforts of the town did not reflect new production so much as a *shift* in production from the "nature sector" to the human sector. Had we included the "nature sector" from the beginning, our national accounts would have shown a decrease in the production of that sector (decreased water retention) offsetting the increase in production of the human sector (that is, repairing buildings or constructing sandbag barriers), netting out in something closer to a wash.

Expenditures that are made simply to compensate for or defend against harmful events are called **defensive expenditures**. The town's expenditures on repairs or floodwalls in our example were simply necessary to maintain the status quo.

> **defensive expenditures:** expenditures necessary just to maintain a status quo situation (that is, necessary to keep well-being from going down in the face of negative developments)

[2] It is unlikely that the forest would completely grow back within the year, but we make this assumption so we don't need to worry at the moment about depreciation of the natural capital stock (the topic of the previous section) while we focus on annual flows.

Clearly, including defensive expenditures as positive additions to GDP, while not taking into account the loss of environmental service production that made them necessary, can result in misleading numbers. We will similarly be mislead if our GDP accounts include the rising cost of hospital services to treat asthma attacks made worse by pollution, or the cost of additional fuel required by the fishing industry as boats must travel farther and farther from port so find ever-scarcer fish.

Reductions in "natural sector production" also often have direct impacts on human well-being without being reflected in measurable defensive expenditures. For example, a person who suffers pain or dies from pollution-aggravated asthma or from contamination of their water by toxic chemicals is harmed by the fall-off in the quality of environmental services, whether or not they "add to GDP" through expenditures on medical treatment.

2.4 The Problem of Valuation

Even if we were able to compile very good information on environmental assets and production in physical terms, there is a very big problem currently standing in the way of directly incorporating environmental accounting into the National Income and Product Accounts. This is the problem of monetary valuation. In the NIPA, all assets and flows are counted in *dollar* terms, based on market prices or some imputation that approximates market prices. We cannot add tons of lumber directly to grams of mercury and come up with a meaningful number. Only if all quantities can be converted to a common measure—in the case of NIPA accounts, dollars—can they be added and subtracted to come up with numbers like "depreciation" or "production."

Putting a dollar value on an asset is tricky even in the simplest case. Many conventions have been adopted to try to standardize the accounts, but they are only conventions, not truths. For example, to *really* know the value of a piece of machinery, one would need to know exactly how long it will last and what the availability and prices of all inputs and outputs related to it will be for as long into the future as the piece of machinery is used. Since we never know the future, we can only made educated guesses. The current NIPA accounts rely on many conventions about, for example, how long various types of machinery are expected to be in use and how fast they will depreciate. The resulting estimates may, of course, often be proved wrong as the future unfolds. A computer, for example, may be expected to hold most of its value for two years, but instead, due to the unexpected invention of a new technology, it could be obsolete within two months.

If assigning a monetary value to manufactured assets that are used for only a few years is difficult, think about how much more difficult it is to get a dollar measure for natural assets! Consider, for example, the value of uranium reserves still in the ground. Perhaps uranium will become more valuable 100 years in the future because countries turn increasingly to nuclear power. Or the price of uranium may fall in the future as countries, concerned about safety and the disposal of wastes, explore other energy sources instead. The discovery of previously unknown mineral deposits, changes in

policies, shifts in consumer demand, and new technologies are among the factors that make predicting the future over the long haul very difficult, and thus make it very hard to determine the value of many assets.

Other assets are difficult to value because, while we have a sense that overall ecological balance is important to human as well as other life on the planet, a specific form of natural capital may have no apparent *market* value. Biologists tell us, for example, that in recent decades there has a been a shocking decline in populations of frogs, toads and salamanders worldwide, and a large increase in deformities in these animals. Clearly degradation of the natural environment is occurring. But since the *market* value of most frog species is zero, there are wide disagreements about how—or even whether—a dollar value could be put on these losses.

Another factor making valuation difficult is the issue of the discount rate. People with a "high time discount rate" tend to put relatively little value on the future, while people with a "low time discount rate" are willing to set aside present enjoyment for future rewards. In an environmental context, the future that is relevant includes all generations to come! Yet coming up with a numerical dollar value for assets requires that a decision be made about how much future generations should count in present decision-making.

Nevertheless, some agencies have attempted to make at least rough calculations of the value of natural capital or its depreciation. World Bank estimates of genuine saving, for example, yielded negative numbers for some less developed countries, particularly in the Middle East and North Africa. Rather than saving for the future, such countries seem to be financing some of current consumption by running down their natural assets—particularly their petroleum.

Turning from the topic of environmental assets (stocks) and their depreciation to the topic of production (flows) of environmental goods and services, the prospect for accounting is mixed. For some environmental production, a valuation in market prices could be determined relatively straightforwardly. For example, the firewood collected free in forests or the fish caught non-commercially during a year, currently not counted in GDP, could be valued at the price of their market equivalents. But for other cases the problem is more difficult.

Take, for example, the logging and flooding story from the last section. Normally, economists would try to value the production of water retention services by an existing forest by looking at some places in which this value has been translated into dollar terms. Let's imagine towns A, B, and C that are all identical, and identically situated relative to forested hillsides. Near town A, the hillside is logged and the town sustains flood damage. The hillside near town B is also logged, but town B spends on sandbagging and avoids damage. The hillside near town C has not been logged. What, then, is the dollar value of a year's worth of water retention services provided by the forest near town C?

Suppose the cost of repairs in Town A, which did nothing to prevent flooding, was $5 million. If you estimate the value of the water retention services of the hillside forest near town C using the **damage cost approach**, you would say that the services are worth $5 million—the standing forest prevents town C from suffering an estimated $5 million in damage.

> **damage cost approach:** assigning a monetary value to an environmental service that is equal to the actual damage done when the service is withdrawn

What if we use town B as the comparison instead? Suppose it spent $100,000 averting damage by building sandbag barriers. Estimating the value of the forest's services using the equally plausible **maintenance cost approach** you would say that the value of the forest's services is $100,000.[3] Having the forest standing on the hillside near town C provides equivalent services as having a sandbag barrier costing $100,000 (abstracting, of course, from animal habitat damage and other concerns). As you can see, the two approaches may not agree—the value of the forest's services to town C could be estimated at either $5 million or $100,000.

> **maintenance cost approach**: assigning a monetary value to an environmental service that is equal to what it would cost to maintain the same standard of services using an alternative method

Another example would be whether to measure the value of unpolluted air in terms of effects of pollution on human health (damage) or in terms of the cost of pollution-control devices (maintenance). So far, some national and international agencies have adopted one convention and some the other in their experimental environmental accounts.

If the withdrawal of environmental services make people suffer or die, then you enter the even more controversial area of trying to assign dollar values to human suffering and human lives. And many environmental effects cross national lines. What is the monetary value of a global "public good" such as a stable climate? On whose account should we tally the loss of deep sea fisheries located in international waters?

The idea of an environmentally adjusted or "greened" GDP appeals to many who are concerned about the problems of a GDP measure that omits important environmental issues. It has proved difficult, however, to arrive at a single estimate of "Green GDP".

2.5: Making Changes: Satellite Accounts

As an alternative to defining a "greened" GDP, many nations have chosen to create supplementary or **satellite accounts** that record changes in important environmental and resource sectors in physical rather than monetary terms. Satellite accounts can give a detailed picture of areas such as forest cover, water resources,

[3] This is sometimes also referred to as the "avoidance cost" or "replacement cost" approach.

mineral assets, land quality, pollution emissions, and pollution control measures, without assigning specific money values.

> **satellite accounts:** additional or parallel accounting systems that provide measures of social and environmental factors in physical terms, without necessarily including monetary valuation.

Countries whose national incomes are derived in large part from exports of mineral or forestry resources, for example, can assess their stocks of ore and count up their remaining timber acreage. Others, with different concerns, can create input-output accounts to get a better idea of where resources are used, where pollution comes from, and which domestic economic sectors are most reliant on imported resources. These accounts are linked to the existing national accounts: for example, economic production of oil is associated with depletion of petroleum reserves, and physical flows of pollutants are related to the output of pollution-generating industries.

The advantage of using satellite accounts is that an extensive database of environmental information can be created, and related to existing GDP sectors, without having to determine a precise monetary value for each category. Transforming physical into monetary measures is not ruled out, however, and can be done whenever reliable and generally accepted techniques for environmental valuation exist. The United Nations has published a systematic guide to integrated economic and environmental accounting using the satellite approach, and many countries have established such accounts.[4]

Unfortunately for the progress of environmental accounting in the United States, funding for the Commerce Department's Integrated Environmental and Economic Accounts (IEESA) was terminated by Congress in 1994, and was not restored in spite of the encouragement given by the National Research Council panel in 1999. The United States has also been the only major industrialized country that has *not* ratified the Kyoto Protocol. In June 2001 President Bush withdrew U.S. support for the Kyoto Protocol, citing doubt about the scientific evidence on climate change, unfairness in the application of prescribed cutbacks, and the "negative impact" compliance with the prescribed reductions in greenhouse gas emissions would have on the U.S. economy. While environmental accounting is moving ahead in many other nations, attention to environmental issues seems to be lagging behind in the United States

Discussion Questions

1. In Burgess County, current irrigation methods are leading to rising salt levels in agricultural fields. As a result, the number of bushels of corn that can be harvested per acre is declining. If you are a county agricultural economist, what two approaches might you consider using to estimate the value of the lost fertility of the soil during the current year? What sorts of economic and technological information would you need to come up with your estimates?

[4] United Nations, *Integrated Environmental and Economic Accounting 2003* New York, United Nations, 2003. httP://unstats.un.org/unsd/envAccounting/seea2003.pdf

2. Some people have argued that the monetary valuation of environmental costs and benefits is important because "some number is better than no number" – without valuation these factors are omitted entirely from GDP accounts. Others say that it is impossible to express environmental factors adequately in dollar terms. What are some valid points on each side of this debate? How do you think this debate should be resolved?

3. Measuring Household Production

Another significant omission in the national accounts, as currently constituted, is the value of much household production. Only two aspects of household production are currently counted in GDP: one, the services of the house itself (the rent paid explicitly or implicitly by residents) and, two, the services provided by paid household workers such as housekeepers and gardeners. The household production of goods and services such as childcare, housecleaning, laundry services, meal preparation, landscaping, and transportation using unpaid labor and household capital goods (such as automobiles and appliances) is not counted.

Even the most conservative estimates of the total value of household production come up with numbers equal to about 25-35% of standard GDP in the U.S., and less conservative estimates put the value as equal to or greater than the value of marketed production. How did this substantial area of productive activity come to be overlooked, and what is being done to remedy this omission?

3.1 The History of Exclusion

Various reasons have been advanced over the decades for why household activities should not count in GDP.

"Households are nonproductive"

One reason given was that households were not part of the economy because they did not produce economic goods. This depends on a definition of "economic" in which factories, farms and office buildings, and the people in them, were taken as defining "the economy." Dating from Victorian times, households and families were often thought of, conversely, as "non-economic," running along more primitive lines of social development, and as somehow "closer to nature" and naturally self-renewing. There was also a gender aspect to this split: for much of the 19th and 20th centuries, "the economy" was a man's world, while "the home" was assigned to women.

This omission of much household production from the national accounts may contribute to a subtle bias in the perceptions of policy-makers who make economic decisions based on them. Since household work is not measured, it may be easy to think

that its not important, or not even an "economic" matter at all. The U.S. Social Security retirement system, for example, gives stipends to people based only on their market wages and years in paid work. Some advocates suggest that people should also get credit for time spent in child raising, for example up to a year of Social Security credit for time taken off with each child, in recognition of the contribution that such unpaid work makes to social and economic life. Having home production counted in GDP might help keep policymakers more aware of its productive contributions.[5]

"It's too hard to distinguish household production from consumption"

Sometimes an argument has been made on the basis of convenience: it is simply too hard, some commentators have argued, to distinguish production activities from consumption activities within the household. If diapering your baby is considered work, should cuddling be considered work, too? If you enjoy cooking as a hobby, isn't that activity more like a form of entertainment than like the work of a paid cook? Should the time you spend playing tennis be considered "productive" and counted in GDP? It's just easier, such commentators argue, to draw the line at the household door than to try to sort out the question of "What parts of the activities are productive?"

Yet the matter of distinguishing production from consumption has been discussed intelligently for decades. A frequently-applied rule is what is called the **third person criterion**: an activity should only be classified as household production if it is in principle replaceable by market or third-person services. Cooking a meal is in this sense "production," since you might alternatively pay someone to cook for you. Playing a game of tennis clearly is not, since paying someone to play on your behalf would be absurd.

> **third person criterion:** the convention that says that an activity should be considered to be production (rather than leisure) if a person could buy a market replacement or pay someone to do the activity in his or her place

The fact that some household productive activities—like some parts of cooking and child care—may sometimes be sources of intrinsic pleasure to some of the people doing the work is, arguably , not particularly relevant. If we insisted that only work that is perceived as neutral or unpleasant should count as "work," then substantial portions of time at *paid* jobs should obviously be excluded as well. There is an increasing realization that the definition of "work" should be centered around the idea that it is an activity that produces something valuable—a needed report, an emotionally healthy child—and not around whether the activity is unpleasant (or not) or paid (or not).

[5] The foremost advocate of this view is Marilyn Waring, author of *If Women Counted* (Harper & Row, 1988).

"GDP measures market production"

Sometimes it is granted that people do engage in productive activities in their roles as household members. For example, in the 1993 United Nations System of National Accounts, it is granted that many household activities "are productive in an economic sense" (SNA, paragraph I.E.1.21). But then you will often hear it said that that GDP aims to only measure production *for the market*. Since household outputs are not sold, this argument goes, it is consistent to exclude them from GDP.

The problem with this argument is that a substantial portion of GDP *already* reflects nonmarket production. Most government production of goods and services is never sold on a market (11% of GDP in 2006). Nor do owner-occupiers really pay rent on their houses to themselves (over 6% of GDP in 2006). As more market substitutes have developed for formerly home-produced goods and services (day care for home child care, prepared foods for home cooked, etc.) it has become less and less tenable to draw the line for defining "the economy" at the household door, imputing "market values" for the services of governments and houses, but not for the unpaid work done within homes.

"Including household production would make too big of a change in the accounts"

The designers of the UN System of National Accounts granted that households do, in fact, produce many goods and services, and that estimated monetary values of these flows would be very large. However, the United Nations statisticians who design the System of National Accounts went on to argue that "The inclusion of large non-monetary flows of this kind in the accounts together with monetary flows can obscure what is happening on markets and reduce the analytic usefulness of the data" for addressing topics such as inflation and economic fluctuations (paragraph I.E.1.21).

In reply, some economists argue that current GDP figures are less accurate for having neglected household production. Most obviously, GDP is understated—a substantial area of valuable productive activity has been overlooked. Perhaps more importantly, changes in an economy over time, such as the true growth rate of production, may be misstated. One of the major economic shifts that occurred during the 20th century was the movement of a large proportion of women from unpaid employment as full-time homemakers into paid employment in market work. In 1870, 40% of all U.S. workers (paid and unpaid, male and female) were full time homemakers; by 2000, the proportion had dropped to 16%.[6] This increase in market work, simultaneous with the increase in purchases of substitutes for home production such as paid child care and prepared foods, were counted as increases in GDP. The value of *lost* household production, however, was not subtracted off. This failure to account for reductions in some home-produced goods and services would tend to mean that GDP growth during the period was *overstated*.

[6] Nancy Folbre and Julie Nelson. "For Love or Money—Or Both?" *Journal of Economic Perspectives* 14(4), 2000, p. 126.

The picture is a bit more complex, however, if you also take into account the changes in the *productivity* of household labor time during this period. Homemakers in 1870 had very little in the way of "capital stock" to work with—probably a coal stove that needed daily cleaning (instead of a range), a washtub and clothesline (instead of a washer/dryer), and an icebox (instead of a refrigerator). Productive investments in household technology have, the evidence suggests, led to people now enjoying cleaner clothes and more interesting and varied diets than previously. While the household sector was shrinking relative to other sectors in terms of labor hours devoted to it, the value of its real product, as least in some areas like cooking and cleaning, was not necessarily falling. This growth in true national product due to changes in household productivity has been entirely missed in standard accounting.

Accounting for household production might also change how we see the cyclical behavior of the economy, since there is reason to believe that the level of household production probably moves **counter cyclically**. That is, when the economy is *down*--in recession—people's "do-it-yourself" work probably goes *up*. While the financial and emotional consequences of lack of needed paid employment should not be trivialized, it is likely that many of the unemployed use some of their extra time doing additional childcare and household tasks. When people are in financial straits, they also tend to economize by replacing market purchases with home-produced goods and services.

> **counter cyclical movement:** when an indicator moves in the opposite direction from the business cycle. It moves up as the economy goes down (into recession), and down as the economy goes up (into recovery).

Comparisons between countries are also made more difficult by the lack of accounting for household production in GDP. In countries of the global South, where such activities make up a much higher proportion of total production, GDP is even more inadequate as an indicator of national production.

3.2 Time Use Surveys

A first step in determining a value for household production is to find out how much time people spend in unpaid productive activities. In the past, estimates of time use for the U.S. came from small and sporadic surveys. However, in 2003, following the lead of many other industrialized countries, the U.S. Bureau of Labor Statistics began collecting data for the first national ongoing survey of time use. The American Time Use Study (ATUS), conducted by the U.S. Bureau of Labor Statistics, asks people age 16 or over in a nationally representative sample to report in detail how they used their time on one particular day.

The results of the survey for 2005 indicate that on average on any given day, 84% of women and 65% of men spend some time doing household activities including housework, food preparation and cleanup, lawn and garden care, or household

management (such as paying bills). When averaged over all responses (including those who had not spent any time on household activities), women spent an average of 2.3 hours per day on these activities, while men spent 1.4 hours.

Some other highlights are summarized in Table 1. These figures are averages for people in all employment categories, and include both weekdays and weekend days.

Table 1. Average Hours per Day Spent in Primary Activities

Activity	**Total**	**Men**	**Women**
Personal care	9.34	9.22	9.62
Eating and drinking	1.21	1.30	1.19
Household	1.82	1.35	2.27
Housework	0.61	0.24	0.96
Food preparation and cleanup	0.51	0.26	0.75
Lawn and garden care	0.20	0.27	0.14
Household management	0.15	0.12	0.17
Purchasing goods and services	0.81	0.63	0.96
Caring for and helping people	0.77	0.55	0.90
Working and work-related activities	3.69	4.44	3.00
Educational activities	0.45	0.47	0.43
Organizational, civic, and religious activities	0.31	0.27	0.35
Leisure and sports	5.14	5.50	4.80
Other activities	0.35	0.28	0.41
TOTAL	24.00	24.00	24.00

Source: "American Time Use Survey – 2005 Results Announced by BLS" BLS NEWS, July 27, 2006, Table 1.

The largest blocks of time reported were for personal care (including sleeping), leisure and sports (including an average 2.6 hours per day of watching television), and working (for pay) and work-related activities (including commuting time).

Unpaid household production is spread over several categories in Table 1. Time spent caring for children or the elderly or ill is included in the category of "caring for and helping people," though these data require closer examination. These tasks may be done as a primary activity, as reported in Table 1. Or they may be done as a secondary activity—that is, done while the person is primarily doing something else, such as shopping or watching television. Other tables released by the BLS reveal that in households with children under 13, women spend an average of 6.4 hours caring for children as a secondary activity, while men spend an average of 4.2 hours.

The most conservative approach to measuring household production would be to count only primary "household" and "caring and helping" activities as productive, yielding an average figure for household production of 2.59 hours per day, compared to 3.69 for paid work and related activities. Even taking this most conservative approach,

household production would then account for 41% of total productive time. Less conservative approaches would also include as "productive" at least some of the time spent purchasing (analogous to how working as a "purchaser" in a business is considered productive), in education activities (that is, investing in human capital), and in caring done as a secondary activity. With such approaches, household production could easily be found to account for well over half of total productive time.

3.3 Methods of Valuing Household Production

Unlike the attempt to incorporate environmental assets and services into the national accounts, which requires considerable development of new techniques of measurement and valuation, the imputation of a value for household production can generally follow a similar procedure to that currently used to impute a value for government production.

Both government production and household production result in goods and services that are generally not sold on markets. Both government production and household production use manufactured capital goods and labor. Hence, as with government production, a quasi-market value for household production could be imputed by summing the values of the labor and capital services devoted to the productive activities.

The major difference is that in the case of household work the labor is *unpaid*. Once time use has been measured in terms of hours spent on various activities, by surveys such as the one just discussed, standard national accounting procedures demand that these hours be assigned a monetary value using some market or quasi-market prices. Economists have developed two main methods of assigning a monetary value to household time use: The replacement cost method and the opportunity cost method.

Replacement cost method

In the **replacement cost method**, hours spent on household labor are valued at what it would cost to pay someone else to do the same job. In the most popular approach—and the one used to generate the most conservative estimates--economists use the wages paid in a general category like "domestic worker" or "housekeeper" to impute a wage. A variant of this method, which usually results in higher estimates, is to value each type of task separately: child care time is valued according to the wage of a professional child care worker, housecleaning by the wages of professional housecleaners, plumbing repair by the wages of a plumber, etc.

> **replacement cost method** (for estimating the value of household production): valuing hours at the amount it would be necessary to pay someone to do the work

Opportunity cost method

The **opportunity cost method** starts from a different view, based on microeconomic "marginal" thinking. Presumably, if someone reduces his or her hours at paid work in order to engage in household production, he or she must (if acting rationally) value the time spent in household production (at the margin) at least the wage rate that he or she could have been earned by doing paid work for another hour. That is, if you choose to give up $30 you could have earned working overtime in order to spend an hour with your child, you must presumably think that the value of spending that hour with your child is at least $30. This leads to using the wage rate *the household producer would have earned in the market* to value household work time. In this case, estimates of the value of nonmarket production can go quite a bit higher, since some hours would be valued at the wage rates earned by doctors, lawyers, managers, etc.

> **opportunity cost method** (for estimating the value of household production): valuing hours at the amount the unpaid worker could have earned at a paid job

Neither approach to imputing a wage rate is perfect. However, it would be hard to argue that perfection has been achieved in any of the other measurements and imputations involved in creating the national accounts, and many argue that imputing *some* value for household labor time, even using minimal replacement costs, is more accurate than imputing a value of zero.

In addition to valuing the time used in household production, a value must be assigned to the capital services provided by appliances, vehicles, and the like. "Consumer durables" spending by households would need to be renamed "household investment" spending, and included as a subcategory of investment rather than consumption. Adding the flow of services that are yielded by these capital goods to the measurement of GDP would require that new calculations be made. But the techniques for estimating such service flows have already been designed for the case where cars, washing machines, etc. are owned by *businesses*. These same techniques could be extended to household capital goods.

While this section focuses on unpaid household work, similar arguments have also been made concerning unpaid volunteer work in communities and nonprofit organizations--the time people spend coaching children's sports teams, visiting nursing homes, serving on church and school committees, etc. In the ATUS, 13% of the people surveyed reported participating in organizational, civic and religious activities on their surveyed day, a figure which includes organized volunteer activities. Were both these forms of work counted, the proportion of production attributed to the "households and institutions" sector would rise considerably.

3.4 Making Changes

Perhaps surprisingly, initial estimates of the value of household services for the United States *predate* the design of the NIPA. In 1921 a group of economists at the

National Bureau of Economic Research calculated that the value of household services would be about 25 to 30% of market national income. Decades later, economist Robert Eisner in 1988 reviewed six major proposed redesigns of the NIPA, all of which included substantial estimated values for household production.[7] In spite of numerous demonstrations of its practicality dating back more than 80 years, however, actual inclusion of household production in the U.S. NIPA remains a project for the 21st century.

Internationally, there is interest in at least gathering data on household production. Many counties, including Australia, Canada, India, Japan, Mexico, Thailand and the United Kingdom, have conducted or are conducting national time use surveys to aid their understanding of unpaid productive activities. The United Nations Statistical Commission and Eurostat (the statistical office of the European Union) are encouraging countries to develop satellite accounts that, similar to the satellite accounts for the environment, provide the necessary information to adjust measures of GDP to take household production into account while not changing the definition of official GDP.

Discussion Questions

1. Discuss the reasons why household production has been excluded from national accounting. Do any of the reasons seem convincing to you? What do you think has been the most important reason why household production has been excluded for so long?

2. Think back on at least one household activity you've done in the last couple of days that would be replaceable in principle by market or third-person services. How would that activity be valued by the replacement cost method? By the opportunity cost method? What sorts of manufactured capital goods were important, along with your labor, in the activity?

4. Measuring Economic Well-Being

Instead of trying to estimate a dollar value for domestic production, some economists insist that instead of – or in addition to – standardized national accounts, more direct indicators of economic well-being are needed. Since the goal of macroeconomics is human well-being, we need to be sure the indicators we pay most attention to are ones that relate to the goal we want to achieve!

4.1 Does Output Measure Well-Being?

Measures of the value of national output (or income) per capita—even improved measures that incorporate environmental concerns and household production—can often be poor indicators of sustainable human well-being. Neglect of the questions of *what*, *how* and for *whom* can mean that growth in production per capita may not lead to

[7] Robert Eisner, "Extended Accounts for National Income and Product," *Journal of Economic Literature* 26(4), December 1988, 1611-1684.

increased welfare. Now we can go into more detail about the problems that arise from focusing on production alone. These include:

Well-being-reducing products

Some outputs decrease rather than increase human well-being. The production of unhealthy foods and drugs, dangerous equipment, and community-destroying urban developments, for example, may lower, not raise, well-being. Even if it is the case that people are apparently willing to pay for such goods and services, either individually (perhaps influenced by media advertising) or through their governments (perhaps influenced by interest group lobbyists), it may be that such decisions reflect poor information or bad judgment when looked at from a well-being point of view.

Defensive expenditures

As discussed earlier, some outputs merely compensate for, or defend against, harmful events. Environmental defensive expenditures are only one example. Others include armaments necessitated by an increase in international tensions, increased spending on police forces to combat increased crime, increased gun ownership due to fear or societal breakdown, or increased medical spending due to a rise in automotive accidents. These increased expenditures do not reflect an increase in welfare, but only an attempt to maintain a status quo situation.

Loss of leisure

A rise in output might come about because people expend more time and effort at paid--and, in expanded accounts, also in unpaid--work. Only looking at the increase in measured output doesn't take into account the fact that overwork makes people more tired and stressed, and takes away from time they could use for enjoying other activities.

Loss of human and social capital formation

Measured output is *lower* to the extent that people eliminate or reduce immediately productive activities in order to invest in schooling or training, or participate in community-building activities. Yet if we consider these as investments in the creation of valuable human and social capital such activities should be seen as *increasing* sustainable well-being.

Well-being reducing production methods

If people are miserable at their jobs, suffering alienation and unpleasant working conditions, their well-being is compromised. This is even more obvious in cases where their health or survival is threatened by unhealthy or dangerous working conditions, even if their work results in a high volume of marketed goods and services.

Unequal distribution

National income may be very unevenly distributed, making some people very rich but leaving others in extreme poverty.

For such reasons, and others, some economists argue that other indicators, including direct measures of well-being outcomes, are necessary either instead of--or more often, in addition to-- improved official national production accounts.

Some of these base their work on an NIPA-like framework, but they include more qualitative judgments about whether specific kinds of "production" actually add to sustainable well-being or perhaps detract from it instead. Some of the redesigns of national accounting suggested by academic economists have included adjustments for well-being-enhancing, or well-being-damaging, production.[8] In 1989, economist Herman Daly and theologian John Cobb, Jr. suggested an alternative measure to GDP which they called the Index of Sustainable Economic Welfare (ISEW), in a popular book entitled *For the Common Good: Redirecting the Economy Toward Community, the Environment, and a Sustainable Future*. That initiative helped to spawn the design of more such measures have been nationally and internationally, generally implemented by nonprofit groups. We will examine one such measure, the Genuine Progress Indicator.

Other academic and nonprofit researchers have moved more directly to the issue of whether the economy is getting better or worse for people by developing indicators of social and economic outcomes enjoyed by the population. We will discuss one such measure, the Human Development Index, developed by a United Nations agency.

4.2 Example: The Genuine Progress Indicator

One measure of well-being expressed in monetary terms is the **Genuine Progress Indicator (GPI),** calculated for the United States by the nonprofit group Redefining Progress.

> **Genuine Progress Indicator (GPI):** a measure of economic well-being that adds many benefits, and subtracts many costs, that are not included in GDP. This measure is calculated by the nonprofit group Redefining Progress.

The GPI takes as its starting point the Personal Consumption Expenditures (PCE) component of GDP for each year, as calculated by the BLS, on the reasoning that this number approximates the welfare associated with consumption. The adjustments made to Personal Consumption Expenditures in order to arrive at the GPI for a recent year (2004) are described in Table 2.

[8] See Eisner, 1988.

Table 2. Calculating the 2004 Genuine Progress Indicator (in billions of 2000 dollars)

The GPI 's Starting Point	
Personal consumption in 2004	7,589
Personal consumption adjusted for income distribution	6,318
Additions of Benefits	
Value of housework and parenting	2,542
Value of higher education	828
Value of volunteer work	131
Services of consumer durables	743
Services of highways and streets	112
Social Costs	
Cost of crime	-34
Loss of leisure time	-402
Cost of underemployment	-177
Cost of commuting	-523
Costs of automobile accidents	-175
Environmental Costs	
Cost of household pollution abatement	-21
Cost of water pollution	-120
Cost of air pollution	-40
Cost of noise pollution	-18
Loss of wetlands	-53
Loss of farmlands	-264
Loss of primary forests	-51
Resource depletion	-1,761
Carbon dioxide emissions damage	-1,183
Cost of ozone depletion	-479
Other	
Net capital investment	389
Net foreign borrowing	-254
Cost of consumer durables	-1,090
The Total: The Genuine Progress Indicator	**4,419**

Source: "The Genuine Progress Indicator 2006: A Tool for Sustainable Development," John Talberth, Clifford Cobb, and Noah Slattery. Oakland: Redefining Progress, 2006.

First, the level of PCE is adjusted for increasing income inequality by dividing by a factor that reflects the growth in the Gini ratio since 1968[9]. Next, some items that increase well-being but are not measured in PCE are added in. Estimates of the value of time spent on household and volunteer work and the value of higher education are added. A measure of the services of consumer durables is added, reflecting the well-being gained from items such as appliances and cars. While most government spending is excluded from the GPI because is it argued that such spending is defensive, services that come from government spending on highways and streets is added.

Then a number of cost items are subtracted. These include estimates of social costs, such as the costs of crime and lost leisure time, and environmental costs, including

[9] The Gini ratio is a measure of economic inequality; a higher Gini ratio indicates greater inequality. The Gini ratio was at a low point in the United States in 1968.

water pollution, the loss of wetlands, and carbon dioxide emission damage. Lastly, a few other adjustments are made. An addition is made for the amount by which the net (manufactured) capital stock grows, on a per-worker basis, on the reasoning that constant or increasing stocks are necessary for sustainability. A measure of net foreign borrowing is subtracted, since consumption financed from foreign borrowing is not economically sustainable. Lastly, the cost of consumer-durable asset purchases is subtracted, to avoid double counting given that a measure of the *services* of consumer durables has already been included.

Real GPI for the year 2004 was calculated at $4.4 trillion, as can be seen in Table 2. This is substantially less than the personal consumption expenditures figure—$7.6 trillion—from which the calculations started. Hence, on net, the subtracted costs—especially environmental costs—are more sizeable than the added benefits. Dividing by the population size, per capita GPI was calculated as $15,035.

Trends in real GDP per capita and real GPI per capita are tracked from 1950 to 2002 in Figure 3. Not only is per capita GPI lower than per capita GDP, it has also grown more slowly. That is, environmental and social costs have been increasing faster than the value of the benefits omitted from standard accounting. Looking at the GPI over time, you get a sense of a steady or even falling level of sustainable well-being, which contradicts the trend you see when looking only at measured GDP.

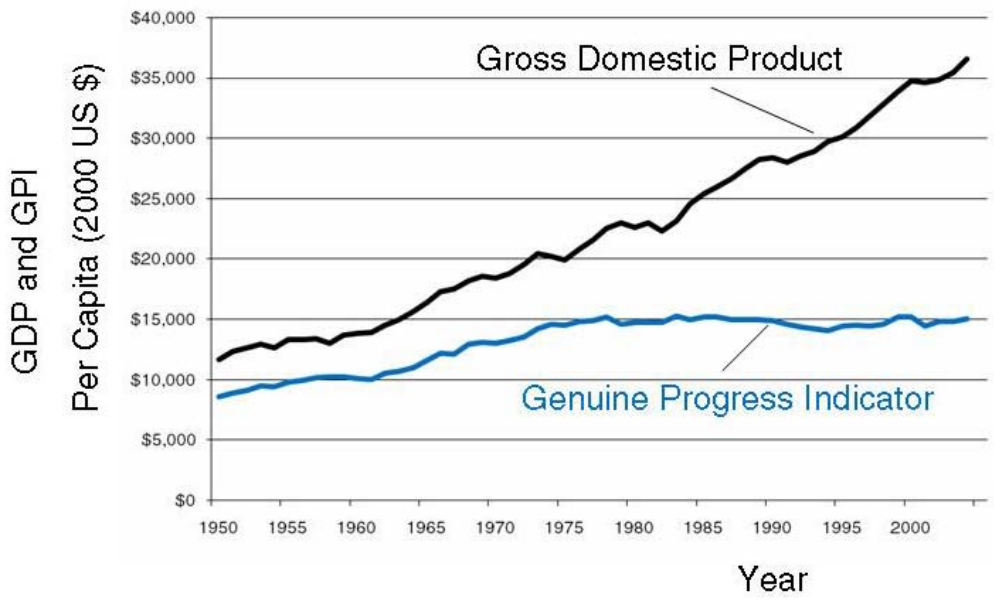

Figure 3. Real GDP per Capita and GPI per Capita Compared
While real GDP per capita has risen substantially since 1950, well-being as measured by per capita GPI has shown less growth.

Source: "The Genuine Progress Indicator 2006: A Tool for Sustainable Development."

4.3 Example: The Human Development Index

Beginning in 1990, the United Nations Development Program (UNDP), under the direction of Mahbub ul Haq and in consultation with Nobel laureate economist Amartya Sen, began publication of a **Human Development Index (HDI)** designed to compete with GDP as a crude index of human welfare.

> **Human Development Index (HDI):** an index of well-being made by combining measures of health, education, and income. Calculated by the United Nations Development Program (UNDP).

The HDI aggregates three indicators of human well-being:

- Life expectancy at birth
- An index reflecting a combination of the adult literacy rate and statistics on enrollments in education
- GDP per capita

That is, not only does the HDI take into account output per capita, but it also takes into account whether national production has been effective in raising well-being outcomes in terms of human longevity and knowledge.

The resulting index is a number between zero and one, and is computed by the UNDP for many countries every year. Examples taken from the *Human Development Report 2007/2008* are shown in Table 3.

Table 3. Human Development Index

HDI Rank	Country	Life Expectancy at Birth (years)	Education Index	GDP per Capita*	HDI
1	Iceland	81.5	0.98	36,510	0.968
12	United States	77.9	0.97	41,890	0.951
26	Korea, Rep. of	77.9	0.98	22,029	0.921
39	United Arab Emirates	78.3	0.79	25,514	0.868
52	Mexico	75.6	0.86	10,751	0.829
99	Sri Lanka	71.6	0.81	4,595	0.743
125	Namibia	51.6	0.78	7,586	0.650
140	Bangladesh	63.1	0.50	2,053	0.547
162	Angola	44.6	0.54	2,335	0.446
177	Sierra Leone	41.8	0.38	806	0.336

Source: UNDP *Human Development Report 2007/2008*
* Expressed in purchasing power parity U.S. dollars

Taking the 177 countries as a whole, there is a rough correspondence between rankings by HDI and rankings you would get by looking at GDP alone. At the top of the rankings by HDI is Iceland, with a life expectancy of 81.5 years, an education index of 0.98, and GDP per capita of $36,510. At the bottom of the rankings is Sierra Leone, with both extremely low GDP per capita and abysmally low indicators for health (life expectancy of only 41.8 years) and education.

Comparisons between HDI and GDP can be revealing about the shortfalls of GDP as an indicator of welfare. Comparisons between HDI and GDP can be revealing about the shortfalls of GDP as an indicator of welfare. For example, the United States ranks forty-second globally in life expectancy, below many lower-income countries as Malta, Chile, and Costa Rica. (See News in Context.) Looking at Table 3, you can see that GDP per capita is higher in the United Arab Emirates than the Republic of Korea, but Korea has been more successful in educating its populace (an education index of 0.98 compared to 0.79). Sri Lanka makes a relatively strong showing on the HDI index, in spite of its low levels of GDP per capita ($4,595), compared to, for example, Namibia, which has a substantially higher measured GDP per capita ($7,586). Among even poorer countries, Bangladesh makes a similarly relatively strong showing compared to Angola, which has a higher income per capita but lower health and education achievements.

HDI and GDP rankings differ for a number of reasons. Countries that score lower on HDI than countries with similar levels of GDP per capita may be plagued by war or by diseases such as AIDS. They often have very unequal income distributions and/or have governments that put a low priority on spending for health and education. Table 3 makes it clear that what is important in determining human welfare is not only *how much* is produced, but also *what* is produced (such as armaments vs. clinics) and *how it is distributed*. Countries with good social infrastructure and a lack of extreme gaps between rich and poor tend to score relatively well on HDI, compared to their achievements measured by GDP alone.

The UNDP also gathers a wealth of other statistics that can be used to measure human development in greater detail. These include measures of disparities between males and females in health, literacy, and political and economic participation; measures of poverty and deprivation (for example, the percent of the population without access to safe water), and statistics on crime and environmental degradation. All of these are important to getting a full picture of human development. They also gather data on topics such as military expenditures, amounts of external debt, and public expenditures on health and education that can help to explaining differences in economic and social outcomes.

4.4 The Future of Macroeconomic Indicators

Due to funding cutbacks, progress on improving macroeconomic measurement within the official accounts is currently largely at a standstill within the United States. Many private groups within the United States, however, as well as official statistical

News in Context: U.S. Slipping in Life Expectancy Ratings

(by Stephen Ohlemacher, Washingtonpost.com (The Associated Press), August 12, 2007.)

WASHINGTON – Americans are living longer than ever, but not as long as people in 41 other countries. For decades, the United States has been slipping in international rankings of life expectancy, as other countries improve health care, nutrition and lifestyles. Countries that surpass the U.S. include Japan and most of Europe, as well as Jordan, Guam and the Cayman Islands.

"Something's wrong here when one of the richest countries in the world, the one that spends the most on health care, is not able to keep up with other countries," said Dr. Christopher Murray, head of the Institute for Health Metrics and Evaluation at the University of Washington.

The shortest life expectancies were clustered in Sub-Saharan Africa, a region that has been hit hard by an epidemic of HIV and AIDS, as well as famine and civil strife.. . Forty countries, including Cuba, Taiwan and most of Europe had lower infant mortality rates than the U.S. in 2004. The U.S. rate was 6.8 deaths for every 1,000 live births. It was 13.7 for Black Americans, the same as Saudi Arabia.

agencies in a number of other countries, are making progress in developing better measures to deal with the social and environmental issues of the 21st century.

No one – and especially not their creators – would argue that alternative macroeconomic indicators have been perfected. It is quite possible to argue about how "costs of family breakdown" can be valued in computing GPI, for example, or whether more direct measures of poverty should be included in HDI.

Of course, no one intimately involved in the creation of the official NIPA would argue that they are perfect, either! The creation of official statistics has often been compared to sausage making: the closer you are to observing the process, the less attractive the final product appears. Only from a distance—when you can remain naively unaware of all the conventions that their creators have had to impose on messy real-world data and all the imputations they have had to make--do "official" statistics look clean and elegant, just as only with a distance from its processing does sausage look appetizing.

All indicators have their flaws, whether due to their definitions and classifications, the data they rely on, or the statistical techniques applied. The important contribution of alternative indicators is the way they bring to our attention significant aspects of the economy, such as environmental and social sustainability, that were not taken into account in the design of traditional 20th century macroeconomic indicators.

Discussion Questions

1. Does the Genuine Progress Indicator include anything you think should be left out, or fail to account for something that you think should be included? Think hard about what you really think human well-being is about.

2. Which do you think is more useful for judging the progress of an economy—GDP, expanded measures of production, measures of production adjusted for well-being effects, or measures of well-being itself?

Review Questions

1. What are the three functions through which the natural environment interacts with the human economy?
2. Ideally, how would consideration of the stock of natural assets be included in the national accounts?
3. Ideally, how would consideration of flows of goods and services from the environment be included in the national accounts?
4. List at four reasons why it is difficult to put dollar values on environmental assets and the environment's production of goods and services.
5. What is the function of environmental satellite accounts?
6. What reasons have been given for excluding household production from measures of GDP?
7. What difference does it make, to the study of macroeconomic trends and design of policy, that household production has been excluded from the national accounts?
8. What information is gathered in a time use survey?
9. Describe the two major methods of estimating the value of labor inputs into household production.
10. Is inclusion of household production in the national accounts a new idea?
11. What are some reasons why measuring *output* may be misleading as a guide to *well-being*?
12. What is the Genuine Progress Indicator? What are some of the adjustments it makes relative to GDP?
13. What is the Human Development Indicator? Why do some countries appear to perform more poorly when ranked by HDI than when ranked by GDP per capita?

Exercises

1. Which of the follow describe a resource function of the natural environment? An environmental service function? A sink function?
   a. a landfill
   b. a copper mine
   c. carbon dioxide (a byproduct of combustion) entering the atmosphere

d. wild blueberries growing in a meadow
e. a suitable temperature for growing corn
f. a view of the Grand Canyon

2. In 2003, a massive oil spill caused heavy damage to the fishing and tourist industries on the north coast of Spain. In addition, there were long-term ecological impacts on fish and wildlife. Describe how this might be accounted for in Spain's 2003 national income accounts, if they were environmentally adjusted:

a. in terms of depreciation of assets
b. in terms of flows of produced goods and services. (Describe in detail how two approaches to assigning dollar values might be applied.)

3. Consumption of oil and natural gas fuels the United States economy, but also has other effects. How might the following be accounted for in the United States national accounts, they were environmentally adjusted?

a. depletion of domestic oil and gas reserves
b. release of greenhouse gases into the atmosphere
c. smoggy air that hides scenery and makes outdoor activity unpleasant

4. How would each of the following activities be classified in the American Time Use Survey? Which ones are productive activities, judged by the third person criterion?

a. having lunch
b. working as a hospital nurse
c. watching TV
d. volunteering for a political campaign
e. cooking dinner
f. grocery shopping with your young child

5. Suppose you buy a bread making machine and some flour and other foodstuffs, take them home, and bake bread with a group of young children who are in your care (unpaid). How would these activities be accounted for in current GDP accounting? How might they be accounted for in an expanded account that includes household production?

6. Describe in a short paragraph why measures of *output* do not always measure *well-being*. Include some specific examples beyond those given in the reading.

7. In calculation of the Genuine Progress Indicator,

a. Which factors are subtracted off, compared to Personal Consumption Expenditures, because they represent *bad* things?
b. Which factors are *not* included in GPI, even though they are included in GDP, because they are defensive expenditures or because of differences in accounting methods?

8. Describe the following:

a. Two ways in which measures of *national assets and output* could be improved.
b. Two attempts to measure *social and economic well-being*.

9. Match each concept in Column A with a definition or example in Column B.

Column A	Column B
a. depreciation of natural capital	i. valuing time at the wage someone gives up
b. satellite accounts	ii. saving less both manufactured and natural depreciation
c. an indicator of well-being including health and educational status	iii. costs of cleaning up a toxic waste site
d. an example of non-marketed production	iv. the value of fish killed by toxic waste
e. opportunity cost method	v. government production
f. genuine saving	vi. the effect on copper reserves of copper mining
g. maintenance costs	vii. Human Development Index
h. well-being-decreasing production	viii. the service performed by a garbage dump
i. a way of measuring well-being (not production) using dollar amounts	ix. the production of health-damaging foods
j. damage costs	x. physical measures that can be related to GDP
k. sink function	xi. Genuine Progress Indicator