PART 1

WEALTH ACCOUNTING

Chapter 1. Introduction: The Millennium Capital Assessment

Chapter 2. The Wealth Stock Estimates

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Introduction: The Millennium Capital Assessment

Can poverty reduction be sustained? The end of the 20th century saw a renewed commitment to ending poverty embodied in the Millennium Development Goals. However, deep concerns remained that current rates of depletion and degradation of natural resources may undermine any progress achieved. Achieving sustainable outcomes will require sustaining the total wealth—produced, human, natural—on which development depends.

Building on several years of effort, including *Expanding the Measure of Wealth* (World Bank 1997), this volume assesses the wealth of the planet in the year 2000. In speaking of *wealth* we are returning to the ideas of the classical economists, who viewed land, labor, and produced capital as the primary factors of production. The chapters that follow detail the levels and changes in these different productive factors across the developing and the developed worlds.

This volume represents the most recent achievement in a long-term program to estimate wealth and its components for a large set of countries. It improves the work in *Expanding the Measure of Wealth* by extending country coverage and by basing the estimation of produced capital and natural capital on a broader set of data. Details on the estimation procedure are provided in appendix 1, while box 1.1 gives a basic exposition of the theory underlying this book.

The composition of wealth varies considerably by region and particularly by level of income. While this disparity may be obvious in comparing a mental image of, say, Malawi and Sweden, subsequent chapters measure this variation rigorously by providing figures for nearly 120 countries on the per capita values of agricultural land, minerals, forests, produced

assets, and an aggregate¹ termed *intangible capital*. Intangible capital includes raw labor, human capital, social capital, and other factors such as the quality of institutions. Tables 1.1 and 1.2² present the big picture on the composition and levels of wealth per capita by income group and for the world as a whole.³

Table 1.1 Total Wealth, 2000

— \$ per capita and percentage shares —

| Income group | Natural capital | Produced capital | Intangible capital | Total wealth | Natural capital share | Produced capital share | Intangible capital share |
|----------------------------------|--------------------|------------------|-----------------------|-----------------|-----------------------------|------------------------|--------------------------------|
| Low-income countries | 1,925 | 1,174 | 4,434 | 7,532 | 26% | 16% | 59% |
| Middle- income countries | 3,496 | 5,347 | 18,773 | 27,616 | 13% | 19% | 68% |
| High-income OECD countries | 9,531 | 76,193 | 353,339 | 439,063 | 2% | 17% | 80% |
| World | 4,011 | 16,850 | 74,998 | 95,860 | 4% | 18% | 78% |

Source: Authors.

Notes: All dollars at nominal exchange rates. Oil states are excluded. OECD: Organisation for Economic Co-operation and Development

Table 1.2 Natural Capital, 2000

— \$ per capita —

| Income group | Subsoil assets | Timber resources | NTFR | Protected Areas | Cropland | Pastureland | Total natural capital |
|------------------------------|-------------------|------------------|------|--------------------|----------|-------------|-----------------------------|
| Low-income countries | 325 | 109 | 48 | 111 | 1,143 | 189 | 1,925 |
| Middle-income countries | 1,089 | 169 | 120 | 129 | 1,583 | 407 | 3,496 |
| High-income countries (OECD) | 3,825 | 747 | 183 | 1,215 | 2,008 | 1,552 | 9,531 |
| World | 1,302 | 252 | 104 | 322 | 1,496 | 536 | 4,011 |

Source: Authors.

Notes: NTFR: Nontimber forest resources. Oil states are excluded.

If development is approached as a process of portfolio management, then the figures make clear that both the size and composition of the portfolio vary hugely across levels of income. Managing each component of the portfolio well and transforming one form of asset into another most efficiently are key facets of development policy.

Changes in real wealth determine future prospects for well-being. Accordingly, an important element of the analysis that follows is the measurement of *adjusted net* or *genuine* saving. Estimated saving rates for over 140 countries show that rates of wealth accumulation are much higher in proportion to gross national income (GNI) in rich countries than in poor countries. This is particularly the case when population growth is factored into the analysis. Evidence suggests that higher natural resource dependence coincides with lower genuine saving rates. Chapters 3 and 5 detail these results.

While the analysis of wealth sheds light on sustainability, it is also directly relevant to the question of growth. Growth is essential if the poorest countries are to enjoy increases in well-being. However, growth will be illusory if it consists primarily of consuming the assets, such as soil nutrients, that underpin the economy.

The linkage between measured changes in real wealth and future well-being only holds if our measures of wealth are suitably comprehensive. This is the prime motivation for expanding the measure of wealth to include a range of natural and intangible capital. This richer picture of the asset base also opens the door to a range of policy interventions that can increase and sustain growth.

Where Is the Wealth of Nations?

The total wealth estimates reported here are built upon a combination of top-down and bottom-up approaches. These are presented briefly in the next chapter and detailed in appendix 1. Total wealth, in line with economic theory, is estimated as the present value of future consumption. Produced capital stocks are derived from historical investment data using a perpetual inventory model (PIM).⁴ Natural resource stock values are based upon country-level data on physical stocks, and estimates of natural

resource rents are based on world prices and local costs. Intangible capital then is measured as the difference between total wealth and the other produced and natural stocks.

While table 1.1 reports an average global wealth per capita of roughly \$96,000, this average clearly masks huge variety. The results by income group are more informative.

Total wealth per capita clearly varies significantly between developed and developing countries.⁵ Beyond these large ratios are three other facts displayed in table 1.1:

- The share of produced assets in total wealth is virtually constant across income groups.
- The share of natural capital in total wealth tends to fall with income, while the share of intangible capital rises.
- The value of natural capital per capita is substantially higher in rich countries than in poor, while the share of wealth is much lower.

The wealth estimates suggest that the preponderant form of wealth is intangible capital, an expected result and an insight that goes back at least to Adam Smith.⁶ A huge variation in intangible capital per capita occurs across income levels. Taking the ratio of intangible capital to produced capital offers a different insight: this ratio varies from 3.8 in low-income countries to 3.5 in middle-income and 4.6 in high-income—a rather small variation. This suggests that over the course of economic development intangible capital and produced capital are accumulated roughly in the same proportion, with a tendency toward produced capital intensiveness at middle-income levels and intangible capital intensiveness at high-income levels.

Does the 2 percent share of natural capital in total wealth for high-income countries mean that natural resources are somehow unimportant in these countries? Table 1.2 suggests not. Per capita values of each of the natural resource categories—subsoil assets, timber and nontimber resources, protected areas, and agricultural land—are higher in rich countries than in poor. What the low natural-capital share suggests is that the development process primarily entails growth in the modern sectors of manufacturing and services, while the primary sectors are relatively static. The estimates of natural wealth presented in this book are also limited by

data—for example, fish stocks are not measured in the estimates, while the environmental services that underpin human societies and economies are not measured explicitly.

Natural Resources and Development

Natural resources are special economic goods because they are not produced. As a consequence, natural resources will yield economic profits—rents—if properly managed. These rents can be an important source of development finance, and countries like Botswana and Malaysia have successfully leveraged natural resources in this way.

There are no sustainable diamond mines, but there are sustainable diamond-mining countries. Implicit in this statement is the assumption that it is possible to transform one form of wealth—diamonds in the ground—into other forms of wealth, such as buildings, machines, and human capital. Achieving this transformation requires a set of institutions capable of managing the natural resource, collecting resource rents, and directing these rents into profitable investments. Resource policy, fiscal policy, political factors, institutions, and governance structure all have a role to play in this transformation.

Exhaustible resources, once discovered, can only be depleted. Consuming rents from exhaustible resources is, therefore, literally consuming capital, which motivates the Hartwick policy rule for sustaining development—invest resource rents in other forms of capital.

Living resources are unique because they are a potentially sustainable source of resource rents—truly a gift of nature. Sustainable management of these resources will be the optimal policy, but the question of the optimal stock size is complex. For example, clearing forest land for agriculture will be optimal up to the point where the land rent on the marginal cleared hectare is just equal to the total economic value of the standing forest.⁷

Land resources are potentially sustainable if managed well. Land is particularly important in the poorest countries because it is a direct source of livelihood and sustenance for many poor households. As table 1.2 shows, cropland and pastureland make up 70 percent of natural wealth in low-income countries and 18 percent of total wealth.

Natural resources play two basic roles in development:

- The first, mostly applicable to the poorest countries and poorest communities, is the role of local natural resources as the basis of subsistence.
- The second is as a source of development finance. Commercial natural resources can be important sources of profit and foreign exchange. Rents on exhaustible, renewable, and potentially sustainable resources can be used to finance investments in other forms of wealth. In the case of exhaustible resources these rents *must* be invested if total wealth is not to decline.

While the preceding discussion has focused on natural *goods*, chapter 3 will also show the importance of measuring environmental *bads* in the form of marginal damages from local and global air pollutants. Pollution, which does not appear directly in the wealth stock estimates, is included implicitly in the form of lowered labor productivity linked to ill health. This depresses income generation, limiting consumption, and accordingly, total wealth.

From a development perspective a key message from table 1.1 is that natural resources make up a very significant share of the total wealth in low-income countries—26 percent—and that this is substantially larger than the share of produced capital. Sound management of these natural resources can support and sustain the welfare of poor countries, and poor people in poor countries, as they move up the development ladder.

Policies and Institutions

A major focus in this analysis is on placing economic values on stocks of natural resources and changes in the values of these stocks. This information is used to illuminate the role that natural resources play in development, particularly in poor countries. The analysis suggests that changes in natural resource management are needed to increase economic benefits, and the need for these changes will lead to reforms of policies and institutions.

From an economic perspective, inefficiencies in resource exploitation can potentially take the form of under- or overexploitation. In practice, incentives for resource management generally encourage excess exploitation, which will depress genuine saving relative to its level under efficient exploitation. Reforming resource management practices can play a significant role in boosting saving levels in highly resource-dependent economies.

Extensive literature exists on policies and institutions for natural resource management, dealing with the very different problems of open- or common-access, exploiting exhaustible resources such as minerals and energy, and managing living resources such as forests and fish. This literature thoroughly explores the roles that different types of policy instruments, property rights, and institutional structures can play in ensuring efficient resource management. This study will not attempt to summarize or add significantly to this literature.

However, an important set of institutions—ministries of finance and treasury—often overlooks the analysis of natural resource issues. The fiscal policy implications of natural resource management in developing countries will be explored below.

Saving and Investment

Saving is a core aspect of development. Without the creation of a surplus for investment, there is no way for countries to escape a state of low-level subsistence.

Adjusted net or genuine saving measures the true level of saving in a country after accounting for depreciation of produced capital; investments in human capital (as measured by education expenditures); depletion of minerals, energy, and forests; and damages from local and global air pollutants. Economic theory suggests that current net saving should equal the change in future welfare, specifically the present value of future changes in consumption (Hamilton and Hartwick 2005).

Resource dependence complicates the measurement of saving effort because a depletion of natural resources often occurs but is not visible in standard national accounts. As will be seen in chapter 3, the dissaving associated with resource depletion is a particular problem in low-income countries.

The saving tests using historical data reported in chapter 6 suggest that a particular variant of genuine saving—one that excludes education expenditures, damage from carbon dioxide emissions, and the immiserating effects of population growth—is a good predictor of future changes in welfare. Genuine saving is therefore an important indicator to guide development policy.

Saving in Developed and Developing Countries

The analysis in chapter 6 includes a further key result: When the sample of countries is limited to high-income countries, there is no apparent empirical relationship between current net saving and future welfare. This raises an important distinction between developed and developing countries. It says quite clearly that asset accumulation, the apparent driver of future welfare when all countries are tested, is not a significant factor in rich countries. This result makes eminent sense—in the richest countries it is clear that technological change, institutional innovation, learning by doing, and efficient institutions, to name a few factors, are fundamental drivers of growth.

It is in developing countries, therefore, where genuine saving is most likely to be a useful indicator to guide policy. As chapters 3 and 5 will show, the poorest countries have the lowest genuine saving rates. The tests of genuine saving suggest that investments in produced capital, combined with saving efforts aimed at offsetting the depletion of natural resources, can lead to future welfare increases in developing countries.

Finally, the step from saving to investment is crucially important. If investments are not profitable, the effect on wealth is equivalent to consumption, but without the boost to well-being presumed to accompany consumption.

Fiscal Policy and Comprehensive Wealth

Expanding the measure of wealth to include natural resources raises an important set of fiscal issues concerning revenues, expenditures, fiscal space, boom-and-bust cycles, and the quasi-fiscal impact of state-owned enterprises (SOEs). Dealing with these issues will not likely turn finance

ministers into environmentalists, but a sharper focus on the fiscal aspects of natural resources can have a substantial impact on macrobalances and economic performance in many countries.

Revenue issues with respect to commercial natural resources are well understood. The government, as the owner of the resource, should be taxing natural resource rents to the point where the private sector is just willing to risk capital in natural resource exploitation. This applies equally to minerals, forests, and fisheries. For forests and fisheries there is the additional concern with sustainability: if sectoral policies encourage overexploitation of the resource, then fiscal revenues from the sector may not be sustained. Finally, there is the issue of rent capture from foreign tourists. If a country's natural resources attract foreign tourists, then taxes on entry and hotels are important instruments for resource rent capture.

For government *expenditures* major questions revolve around the use of resource revenues. In principle, the government should seek to reinvest royalties on exhaustible resources in other assets—thereby maintaining the total wealth of the nation. The caveat to this basic rule is that public investments must be profitable. The issue of profitability may raise questions of absorptive capacity—the capacity of governments to make productive investments—which is typically constrained by the availability of factors such as skilled labor and infrastructure. Countries with significant debts have the option of investing resource rents in debt reduction. Whether this is a good investment depends on the social returns to the best alternative project. In addition, certain types of development expenditures, for example, on national parks, may not appear to be particularly profitable from the treasury's viewpoint; a broader view, though, may suggest that investments in parks will increase tourist sector growth and increase fiscal revenues from tourists.

The phenomenon of *fiscal boom-and-bust* is common for many resource exporters where government revenues are highly dependent on resource royalties. *Easy money* in the form of resource revenues tempts governments to increase consumption expenditures when commodity prices are buoyant. These expenditures are often difficult to rein in when the inevitable commodity bust arrives, leading to major fiscal imbalances. Generally, investing resource rents requires a system to help governments stabilize resource revenues, as well as instruments, such as medium-term expenditure frameworks, to control expenditures.

Comprehensive wealth accounts offer new insights into the question of *fiscal space*, that is, the ability of the government to increase expenditure without jeopardizing its ability to service its debt. Generally, the measure of a government's change in fiscal stance is the change in its net worth. This suggests that tax revenues from exhaustible resources do not fully increase fiscal space because a portion of these taxes represents the consumption of natural capital. While the news that fiscal space is not as large as conventionally measured will not be welcomed by most treasuries, prudent governments will heed the bad news.

SOEs are common in the resource sectors and present *quasi-fiscal* risks of their own. The low efficiency of these enterprises may lead to the growth of liabilities. If the enterprises are off-budget, then these contingent fiscal liabilities are typically not factored into the government's fiscal stance. If the enterprises are on-budget, then they often do not have retained earnings out of which to finance capital expenditures; the result is that the investment needs of the SOE become part of the government development budget. In this case there is a risk of undercapitalization of SOEs.

Botswana provides an example of sound management of many of these fiscal issues with respect to its diamond wealth. The treasury calculates a sustainable budget index to determine whether consumption expenditures are being financed out of resource rents and adjusts expenditures accordingly. It also holds diamond revenues offshore in order to deal with issues of absorptive capacity, revenue stabilization, and Dutch disease effects from currency appreciation.

Investing in the Intangible Capital Residual

From a policy perspective a potential problem may arise with calculating such a large intangible capital residual. Since the residual necessarily includes a wide array of less-tangible assets—for example, raw labor, human capital, social capital, or quality of institutions—it raises the question of whether virtually *any* component of public spending could be considered to be a type of investment. To explore this question using cross-sectional data, chapter 7 estimates the major factors contributing to the intangible capital residual, and tables 1.3 and 1.4 present some key results.

Table 1.3 Factors Explaining the Intangible Capital Residual

| Factor | Elasticity | | |
|-------------------------|------------|-----------|------|
| School years per capita | 0.53 | R-squared | 0.89 |
| Rule of law index | 0.83 | | |
| Remittances per capita | 0.12 | | |

Source: Authors.

Note: Coefficients are significant at the 5 percent level.

Table 1.4 Marginal Returns to Different Factors

| Income group | School years per capita | Rule of law index | Remittances per capita |
|------------------------------|----------------------------|-------------------|------------------------|
| Low-income countries | 838 | 111 | 29 |
| Middle-income countries | 1,954 | 404 | 39 |
| High-income countries (OECD) | 16,430 | 2,973 | 306 |

Source: Authors.

Note: Figures represent the increase in the intangible capital residual associated with a 1-unit increase in the given factor.

Any model of the intangible residual must include only factors that are not already captured in the value of produced capital and natural resources, since these have been subtracted from total wealth in order to calculate the residual. Table 1.3 shows that three such factors—average years of schooling per capita, rule of law, and remittances received per capita—explain 89 percent of the total variation in the residual across countries.

Policy makers, therefore, can be reasonably confident that investments in education and the justice system, as well as policies aimed at attracting remittances, are the most important means of increasing the intangible-capital component of total wealth. The elasticities reported in table 1.3 show that, on average, for all countries a 1 percent increase in rule of law pays large dividends, boosting intangible capital by 0.83 percent; 1 percent increases in the stock of schooling or remittances per capita will increase intangible capital by 0.53 percent and 0.12 percent, respectively.

Table 1.4 reports the marginal returns, measured at the mean, to unit increases in the three factors for each level of income. Increasing the

average stock of schooling by one year per person increases total wealth per capita by nearly \$840 in low-income countries; nearly \$2,000 in middle-income countries; and over \$16,000 in high-income countries. The wide range reflects the *gearing* effect of having larger stocks of produced capital at higher-income levels, as well as the use of nominal exchange rates. A one-point increase in the rule of law index (on a 100-point scale) boosts total wealth by over \$100 in low-income countries, over \$400 in middle-income countries, and nearly \$3,000 in high-income countries.

Setting aside the smallest factor, remittances, it is worth considering how finance ministries can invest in the factors explaining the intangible capital aggregate. Education expenditure can obviously play a role, but these expenditures have to be effective in actually creating human capital. Investing in rule of law is clearly complex. Issues of judicial salaries, for example, can be important. However, the larger problem is building trusted, competent legal institutions, thereby creating confidence in the minds of citizens and entrepreneurs that their rights will be protected. The returns to doing so, reported in chapter 7, are potentially very large.

Conclusions

The notion of development as portfolio management is powerful. Certain assets in the portfolio are exhaustible and can only be transformed into other productive assets, such as infrastructure or human capital, through investment of the resource rents. Other assets are renewable and can yield sustainable income streams. Economic analysis can guide decisions concerning the optimal size of these assets in the portfolio. Some assets, such as produced capital, depreciate over time. National savings can be used to invest in natural assets, produced capital, or human capital. The choice of investment will depend on the asset with the highest marginal return on investment, a standard tenet of public finance.

Each year from 10 to 20 developing countries have negative genuine saving rates. What should the policy response be? Monetary and fiscal policies affect saving behavior, and public sector dissaving can be a key target of policy. If investment in human capital is measured as saving, then efforts to increase effective education expenditures can boost overall

saving. For natural resources the general prescription is not to simply reduce exploitation, but rather to reduce incentives for overexploitation, which will typically entail reforms in the resource sectors.

The evidence presented in subsequent chapters shows that low or negative saving is primarily an issue in low-income countries and some resource-dependent middle-income countries. For resource-dependent middle-income countries, negative saving is almost always a reflection of excessive government consumption expenditure. Conversely, for the poorest countries a prescription to boost saving by reducing consumption is clearly unpalatable. A better policy response is to boost the productivity of all assets, including resource assets, in these countries through policy and institutional reforms, leading to a cycle of rising consumption and saving.

BOX 1.1 The Theory of Wealth, Welfare, and Sustainable Development

Wealth, welfare, and sustainability are closely interlinked. Pezzey (1989) suggested a straightforward definition of sustainability: a development path is sustainable if utility does not decline at any point along the path. Dasgupta (2001) offers a more general definition: a development path is sustainable if *social welfare* does not decline at any point along the path. Social welfare is in turn defined to be the present value of utility along the development path—it is a measure of intertemporal wellbeing.

While a useful concept, utility is not directly observable. This raises a measurement challenge: can we define an index of measurable quantities that can be shown to be related to social welfare? The suggestion that *total wealth* can provide such a measure is presented in Samuelson (1961): "...the only valid approximation to a measure of welfare comes from computing *wealth-like* magnitudes not income magnitudes." According to Samuelson, the work of Irving Fisher (1906) pointed the way: current wealth should equal the present value of future consumption. Hamilton and Hartwick (2005) show that the sum of the values of a heterogeneous set of assets (total wealth) is equal to the present value of future consumption. These notions of wealth and welfare underpin the basic calculation of total wealth in this book.

It follows that if total wealth is related to social welfare, then changes in wealth should have implications for sustainability—this is the basic intuition of Pearce

and Atkinson (1993). For optimal economies, economies where a planner can enforce the maximization of social welfare, a number of results have made the link explicit (it is implicit in Weitzman [1976], but not derived). Aronsson and others (1997, equation 6.18) show that net saving in utility units is equal to the present value of changes in utility, using a time-varying pure rate of time preference. Hamilton and Clemens (1999) show that net or 'genuine' saving adjusted for resource depletion, stock pollutant damages, and human capital accumulation is equal to the change in social welfare measured in dollars; they also establish that negative genuine saving implies that future utility must be less than current utility over some interval of time. This motivates the focus on savings in chapter 3 below.

These results depend on the assumption that governments maximize social welfare. Dasgupta and Mäler (2000) show that net investment is equal to the change in social welfare in a nonoptimizing framework where a resource allocation mechanism is used to specify the mapping from initial capital stocks to future stocks and flows in the economy. This result depends on accounting prices for assets being defined as the marginal changes in social welfare resulting from an increment in each asset (that is, accounting prices are the partial derivatives of the social welfare function). Arrow and others (2003a) explore the accounting issues under a variety of resource allocation mechanisms.

In this book resource stocks and resource depletion are valued using world prices and local costs of extraction and harvest. The use of border prices is consistent with how projects would be evaluated using social cost-benefit analysis, but it is not explicitly linked either to assumptions about optimality or to any specific resource allocation mechanism as in Dasgupta and Mäler (2000).

Hartwick (1977) provided the canonical rule for sustainability in resource-dependent economies—if genuine saving is set equal to zero at each point in time (that is, traditional net saving just equals resource depletion), then consumption can be maintained indefinitely, even in the face of finite resources and fixed technology. Hamilton and others (forthcoming) show that this can be generalized to a rule with constant positive genuine saving; such a rule will yield unbounded consumption. Chapter 4 calculates countries' produced capital stocks under the alternative Hartwick rules during 1970—2000; these calculations are then compared with actual year 2000 capital stocks.

If population grows over time, as in virtually all developing countries, then changes in total wealth should take into account the change in population.

Dasgupta (2001) shows that wealth per capita is the correct measure of social

welfare if certain conditions are met: (i) population grows at a constant rate; (ii) per capita consumption is independent of population size; and (iii) production exhibits constant returns to scale. This book calculates wealth per capita as the measure of social well-being under these assumptions, as do Arrow and others (2004). The measure of the change in wealth per capita derived in chapter 5 below includes a specific adjustment for the immiserating effects of population growth. Arrow and others (2003b) identify the correct welfare index in more general situations.

Finally, the result linking net saving to changes in social welfare in Aronsson and others (1997) can be extended to show that current saving equals the present value of changes in consumption in an optimizing economy. Dasgupta (2001) shows that the same is true in nonoptimal economies where accounting prices are defined as above. Hamilton and Hartwick (2005) show that this relationship holds in an optimal economy, but their proof clearly only requires that the economy be competitive. This relationship between current saving and the present value of future changes in consumption is exploited in an empirical test of genuine saving in chapter 6.

Endnotes

- 1. Intangible capital includes raw labor, human capital, social capital, and other important factors such as the quality of institutions.
- 2. All references to dollars (\$) are in U.S. dollars.
- 3. Oil states (where oil rents exceed 20 percent of GNI) are excluded and are discussed separately in later chapters. The very large resource endowments of these countries make them outliers in the analysis of wealth.
- 4. Pritchett (2000) argues that cumulating investments in this way is likely to overstate the value of capital stocks in developing countries, because the method does not account for the profitability of these investments.
- 5. The use of nominal exchange rates explains part of the high variation. Purchasing Power Parities (PPP) are typically used to compare welfare between developed and developing countries. Welfare measurement is not the prime concern in this volume, where the focus is on variation in the composition of wealth across income levels, changes in wealth, and the role of natural assets in development.

- 6. In An Inquiry into the Nature and Causes of the Wealth of Nations, Adam Smith (1776) wrote: "The annual labour of every nation is the fund which originally supplies it with all the necessaries and conveniences of life which it annually consumes." Smith recognized "the skill, dexterity, and judgment with which [...] labour is generally applied" as a precondition for generating supply "whatever be the soil, climate, or extent of territory of any particular nation."
- 7. Total economic value in this instance would include the rents on sustainable timber and nontimber off-take, value of carbon sequestration, and local (and potentially global) willingness to pay for the external services that forests provide.