Inclusive Wealth Report 2014

Measuring progress toward sustainability

The *Inclusive Wealth Report 2014* is a joint initiative of the UN University – International Human Dimensions Programme (UNU-IHDP) and the UN Environment Programme (UNEP), in collaboration with the UNESCO-Mahatma Gandhi Institute of Education for Peace and Sustainable Development (UNESCO-MGIEP), ASCENT Africa Sustainability Centre, the Malaysian Industry-Government Group for High Technology (MIGHT), Science to Action (S2A), the Ministry of Environment – Government of Japan, the UN University – Institute for the Advanced Study of Sustainability (UNU-IAS), and endorsed by the Science and Technology Alliance for Global Sustainability.

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Secretariat of the
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on Global Environmental Change

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Foreword

National accounts are descriptors. They describe the state of an economy and form the raw material for both assessing performance and prescribing policy. National accounts are meant to contain the kinds of information that are essential for economic evaluation.The system of national accounts currently in use throughout the world, however, suffers from extreme narrowness. Vast quantities of information relevant for economic evaluation do not appear in them. Some don't because the appropriate data are hard, even impossible, to collect; but others don't because until recently the theory and practice of economic evaluation didn't ask for them. The demand for "green national accounts" has arisen because of a growing recognition that contemporary national accounts are an unsatisfactory basis for economic evaluation. The qualifier, "green", signals that we should be especially concerned about the absence of information on society's use of the natural environment.

The IWR 2012

The inaugural publication on inclusive wealth (the IWR 2012), issued jointly by UNU-IHDP and UNEP, provided an account of what would ideally be needed for a comprehensive set of national accounts. The procedures recommended there were put to work in estimating changes in inclusive wealth per capita during 1990-2008 in 20 countries that represent various stages of economic development. The publication revealed that national governments and international agencies ought to go beyond even green national accounts, by reclassifying certain classes of goods and services and adding others that are currently missing. For the present, the ideal can be approximated at best crudely, which is what the IWR 2012 achieved. Data on many items that ought to be included will of necessity appear only in physical terms for some time yet, while many other items of significance (ecosystems other than forests, for example) will continue to be missing even in physical terms. Economic evaluation inevitably involves cutting corners. But it is essential for good practice to know where the corners that are being cut happen to be. That is why

the authors of the IWR 2012 went extensively into the conceptual foundations of economic evaluation.

The IWR 2012 offered a set of capital accounts for each of the 20 countries on its list, akin to balance sheets of private firms. Inclusive wealth is the social value of an economy's capital assets. The assets comprise (i) manufactured capital (roads, buildings, machines, and equipment), (ii) human capital (skills, education, health), and (iii) natural capital (sub-soil resources, ecosystems, the atmosphere). Such other durable assets as knowledge, institutions, culture, religion – more broadly, social capital – were taken to be enabling assets; that is, assets that enable the production and allocation of assets in categories (i)-(iii). The effectiveness of enabling assets in a country gets reflected in the shadow prices of assets in categories (i)-(iii). For example, the shadow price of a price of farming equipment would be low in a country racked by civil conflict, whereas it would be high elsewhere, other things being equal.

The system of national accounts (SNA) that are still being developed by the United Nations and their affiliated international agencies do not yet contain several of the additions and reclassifications that were made in the IWR 2012. That is why the empirical estimates reported in the IWR 2012 were of significance. Being a first attempt, the estimates were conducted mainly with natural capital in mind. Even within that category, attention was paid to forests, land, sub-soil resources, and the atmosphere as a sink for carbon. Estimates of human capital were restricted to education, whose measurement has a long history in economics.

The present publication extends the IWR 2012 in three ways: (a) the coverage is 140 countries; (b) the basis for the estimates of education as a capital asset is the more sophisticated approach developed by Dale Jorgenson and his collaborators; and (c) health as a form of capital asset receives attention in the main body of work. Health poses special problems of estimation, so it is worth explaining why.

Health capital

Health is a capital asset and should be seen as a component of a person's human capital. In order to compare the relative significance of an economy's various capital assets with one another, they have to be expressed in a common currency. That common currency is typically monetary, say, dollars. But the currency could have been any chosen commodity, or a basket of commodities, for example, a basket of consumption goods. Health capital is health status expressed in that common currency.

Good health brings three benefits to a person:

1. It adds directly to the person's well-being (she feels good);
2. It enables the person to be productive (a healthy person works better and can work for longer hours than an unhealthy person);
3. It contributes to her longevity (a healthy person can be expected to live longer than an unhealthy person).

Items (1) and (3) are direct benefits (they constitute aspects of a good life), while item (2) is an indirect benefit (a means to a better life). It is humanity's good fortune that good health offers the three benefits jointly (they are not in competition!). Economists have developed elaborate methods for estimating the value of each type of benefit. Some involve asking people to report their willingness to pay for the benefits ("reported preference"), while others estimate the value of the benefits to people by observing their behavior ("revealed preference"). One way to estimate the combined benefit of improved health is by recording people's willingness to pay for better health (e.g., observing how much people spend on health). Some studies estimate the benefits enjoyed from item (2) by the output lost when workers are absent owing to illness (the costs of air pollution are often estimated on the basis of lost days of work owing to bronchial congestion).

Unfortunately, there are no systematic studies of items (1) and (2) that could be used to cover the 140 countries in question. The present study confines itself to item (3), by using tables that have been prepared by economists reporting the value of a statistical life in various countries. The approach is not without its weaknesses, but a first step had to be taken, and the authors of the IWR 2014 are to be applauded for inaugurating in an official

publication what is likely to be a long process of evaluation of health as a form of capital asset.

That said, I do not believe that a central finding of the publication will be overturned, no matter how refined the valuation exercise becomes in future. It is that health is the most significant component of the wealth of nations. The authors show that it swamps the value of all other forms of capital assets by an order of magnitude and more. This will come as a surprise to all of us who have thought that in a reasonably well-ordered society the various forms of capital assets are on a par with one another; after all that is what the theory of economic development tells us to expect. The estimates in the IWR 2014 tell us otherwise.

Partha Dasgupta
Chair of the IWR science advisory group and
Frank Ramsey Professor Emeritus of Economics
at the University of Cambridge

Preface

There can be no doubt that, over the past two decades, many countries have done much to improve their citizens' well-being. Of course, some have a better record than others, but overall the trend has been positive. Gross domestic product (GDP), although stagnant in some highly advanced economies, has risen steadily across most of the world. Human Development Index (HDI) scores have also improved for a substantial number of countries over the same time period. A cursory glance at these two trends might suggest that we are on the right track; that we should continue with business as usual.

Countries have spent decades chasing production, consumption, and employment at all costs as the ticket to well-being.

That first glance would be misleading. Over the past twenty years we have seen, it is true, enormous gains in economic activity and output, and indeed as well in many of the quality of life indicators comprising the HDI.

On the other hand, serious questions have arisen as to the equitability and – more importantly – the sustainability of those gains. As Thomas Piketty demonstrated in his groundbreaking Capital in the Twenty-First Century, inequality is steadily growing, and will continue to as long as returns on capital exceed the rate of overall growth. In the era of globalization and instant communication, such levels of inequality, both within and across nations, are unsustainable.

Meanwhile, these gains have, as they have since the onset of Industrialization, come at a massive cost to ecosystem health, biodiversity, air quality, and climate resiliency.

One of the welcome key outcomes of the Rio+20 Conference on Sustainable Development was the agreement by countries to focus explicitly on sustainability in crafting the post-2015 development agenda. It is thus that the successors to the Millennium Development Goals will be known as the Sustainable Development Goals.

But how will we know when we are developing sustainably?

GDP growth still dominates policy planning, implementation, and evaluation for countries of all levels of development. Yet we have no way of knowing whether that growth is sustainable and inclusive – whether the activities that generate that growth will be possible in five years or fifty; whether they enrich the few at

the expense of the many. Countries have spent decades chasing production, consumption, and employment at all costs as the ticket to well-being. But there is more to well-being than GDP, and it is time countries have approached policy planning strategically, and over the long term.

We hope that policy-makers will see the IWR 2014 as a useful tool, and as encouragement ...

We have seen, since the seminal Brundtland Report in 1987, successive efforts call for audacity and ambition in tackling sustainability, but with only limited success. We will continue to see only limited success so long as our definitions of economic success and socioeconomic well-being continue to be based on GDP.

The case against GDP as a metric for economic success and socioeconomic well-being can be distilled into three main points: The first relates to the extent to which income alone is conflated with well-being. Although it is undoubtedly a necessary condition for well-being, it is not a sufficient one. As the World Bank's Voices of the Poor study found, poor people themselves define well-being not only in terms of income, but as "peace of mind, ... belonging to a community, ... safety, ... [and] good health", among others.

Second, GDP measures gains in production and output at market prices, but ignores the environmental externalities produced through the production process. Nor does GDP reflect scarcity arising from dwindling natural resources, which are often public goods with no market prices.

Third, GDP represents flows only for a specified, generally short, time period. It does not provide information on the state of those capital stocks necessary to generate the income measured. Equally important, it provides no insight into whether those capital stocks – what we call inclusive wealth – are sufficient to generate consumption flows for future generations.

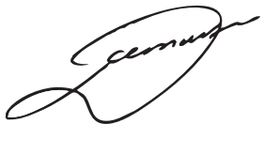
The Sustainable Development Goals are thus destined for only limited success as long as we are missing an adequate framework to measure progress, and do so in an integrated and holistic manner.

The Inclusive Wealth Report (IWR) aims to provide a comprehensive overview of the status of capital stocks of three key assets for nations. These assets are tracked over the past 21 years, and the sustainability implications of trends and changes in these assets are appraised. The report does not attempt to provide a comprehensive overview of human well-being. Instead, it provides guidance and insight for policy-makers on how their economies are generating income, how depreciation and reinvestment are affecting capital stocks, and whether system trajectories are sustainable.

The IWR 2014, while still suffering from incomplete data in some areas, is a significant improvement over the IWR 2012 in

both breadth and depth, particularly in the areas of education and health capital stocks. We hope that policy-makers at the international, national, and state level will see the IWR 2014 as a useful tool, and as encouragement to take the steps necessary to close gaps in data and to utilize the inclusive wealth accounts presented in the report as guidance.

We acknowledge that it may be early to use the report for practical policy-making; however, this was also the case 60 years ago, when nations began designing economic policies based on an incomplete set of GDP accounts. We are confident that countries will recognize the need for a comprehensive and integrated picture of the three pillars of sustainability, and the benefit of a tool to monitor and assess it. The report, however, should not only be useful for policy-makers but also our education systems, educators, and students – providing an understanding of the productive base available to societies and how it has to be managed to ensure sustainability of human well-being. We hope countries find the IWR 2014 useful as they gather in 2015 to finalize the post-2015 development agenda and the Sustainable Development Goals. It is time to plan – and measure – the future we want holistically, and inclusively.



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Science Advisory Board

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Reviewers

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IWR Team

As an initiative hosted by UNU-IHDP Secretariat, the IWR has involved many people that devoted much time and energy. Anantha Duraiappah, Executive Director of IHDP, who conceived of the idea for an IWR as early as 2008, took the lead as the IWR Director. Pablo Muñoz, Academic Officer at IHDP, who coordinated and oversaw scientific inputs to the report, is the IWR's Science Director. Elorm Darkey, Cecilia Fernandes, and Kira Petters provided analytical and quantitative support. We are equally grateful to our interns who devoted their time to this project, including Sergio de Marco and Muzaffar Yunusov. Special thanks to Katja Cloud and Louise Schenk, art and layout designers, as well as our consultants John Tkacik and Carmen Scherkenbach. We are also grateful to Sabrina Zwick for her technical and logistical support. And we would like to thank Terry Collins for helping disseminate the report through press releases and other media forums.

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Abbreviations

BAU . . . . . business as usual
BMI. . . . . body mass index
CGE . . . . . computable general equilibrium
CLA . . . . . physical amount of total cropland area of country
CO2 . . . . . carbon dioxide
DSB . . . . . Dispute Settlement Body
ECE . . . . . estuarine and coastal ecosystems
EDF . . . . . expected damage function
EGP . . . . . Egyptian Pound
EIA . . . . . Energy Information Administration
EPA . . . . . United States Environmental Protection Agency
ESVD . . . . . Ecosystem Service Valuation Database
ESW. . . . . ecosystem service wealth
EU. . . . . European Union
EU KLEMS. . EU level analysis of capital (K), labour (L), energy (E), materials (M) and service (S) inputs on a detailed activity level: statistical and analytical research project to analyse productivity and growth across Europe
FAO . . . . . Food and Agricultural Organization of the United Nations
GBM . . . . . geometric Brownian motion
GDP . . . . . gross domestic product
GHG. . . . . greenhouse gas
GIS . . . . . geographical information systems
GTAP . . . . . Global Trade Analysis Project
GTAP . . . . . Global Timber and Forestry Data Project
HAD . . . . . High Aswan Dam
HC . . . . . human capital
HDI. . . . . Human Development Index
HS . . . . . crop classification
HTA . . . . . health technology assessment
IALS . . . . . International Adult Literacy Survey
IEA . . . . . International Energy Agency
IW. . . . . inclusive wealth
IWI . . . . . Inclusive Wealth Index
IWIadj . . . . . Adjusted Inclusive Wealth Index
IWR . . . . . Inclusive Wealth Report
KPMG . . . . . Klynveld Peat Marwick Goerdeler
MA . . . . . Millennium Ecosystem Assessment
MW . . . . . megawatt
NAFSA . . . . Association of International Educators
NC . . . . . natural capital
NCC. . . . . Natural Capital Committee
NDP . . . . . net domestic product
NIA. . . . . national income account
NPV . . . . . net present value
NRC. . . . . National Research Council
NTFB. . . . . value of non-timber forest benefits
NTFP. . . . . non-timber forest products
OECD . . . . . Organisation for Economic Co-operation and Development
ONS. . . . . Office of National Statistics
PC. . . . . produced capital
PCE . . . . . personal consumption expenditure
PIAAC . . . . . Programme for International Assessment of Adult Competencies
PIM. . . . . perpetual inventory method
PISA. . . . . Programme for International Student Assessment
PLA. . . . . physical amount of pastureland area available
PPI . . . . . per capita income, adjusted by a private consumption
PPP . . . . . purchasing power parity
REDD. . . . . Reducing Emissions for Deforestation and Degradation
RICE. . . . . Regional Integrated Climate-Economy
RPA . . . . . rental price per hectare
SEEA . . . . . System of Environmental and Economic Accounts

SEPA	State Environmental Protection Administration
SNA	System of National Accounts
STEM	science, technology, engineering, and mathematics
TEEB	The Economics of Ecosystems and Biodiversity
TFP	total factor productivity
UN	United Nations
UN–DESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNECE CES	United Nations Economic Commission for Europe - Conference of European Statisticians
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UN–OWG	United Nations - Open Working Group
UNU–IAS	United Nations University – Institute for the Advanced Study of Sustainability
UNU–IHDP	United Nations University – International Human Dimensions Programme on Global Environmental Change
USSR	Union of Soviet Socialist Republics
VARG	The Value at Risk or Gain
VLS	value of a statistical life
VLSY	value of a statistical life year
WAVES	Wealth Accounting for Valuation of Ecosystem Services
WCL	wealth in cropland
WDR	World Development Report
Wha	wealth per hectare
WPL	wealth in pastureland
WTO	World Trade Organization
WTP	willingness to pay

Executive summary

The goals of the IWR 2014

The primary objective of the 2014 Inclusive Wealth Report (IWR 2014) is to provide quantitative information and analysis on long-term trends in global inclusive wealth (IW), and in doing so paint a picture of how nations are performing in their efforts to sustainably improve the well-being of their citizens.

Another objective of the report is to further drive global efforts toward improving conceptual understanding – and quantitative evaluation – of the components of inclusive wealth that remain all-too poorly understood: natural capital and human capital.

The IWR 2014 strives to cement the role of the Inclusive Wealth Index (IW) as the leading comprehensive indicator for measuring nations' progress on building and maintaining inclusive wealth – a central pillar of the sustainability agenda – and gauging global sustainability as part of the post-2015 development agenda as outlined in the Sustainable Development Goals.

Structure and content of the IWR 2014

The IWR 2014 is presented in three parts and eight chapters, each beginning with key messages.

Part I comprises two chapters. Chapter 1 presents the empirical computations of inclusive wealth for 140 countries over the period of 1990 to 2010. Particular attention is paid to changes and trends in inclusive wealth, and respective changes across human, natural, and produced capital, as well as a comparative analysis with those of GDP and HDI. Chapter 1 provides an analysis of per capita trends, demonstrating the role population growth plays in sustainability.

Chapter 2 provides basic policy guidance for improving the inclusive wealth of a country, and offers initial ideas on how the IWR can be utilized to address typical policy challenges, such as energy and agricultural policy. The chapter also discusses some of the pitfalls of present health investment policies, and suggests gaps that the

IWR might address. The chapter concludes with suggestions on how to revise national accounts to include wealth accounts.

Part II of the report provides a detailed analysis of human capital wealth accounts. Chapters 3 and 4 offer in-depth reviews, as well as recommendations, on methodologies for generating education wealth accounts, and suggest using the lifetime income approach to measure human capital, which uses information on gender, demography, and age, among other categories, to compute the contribution of education to sustainable development.

Chapter 5 focuses on the theoretical model for computing health wealth accounts. The chapter gives insights into the contribution of health to human well-being, and the ways in which health is valued as a capital asset. There is considerable controversy involved in using valuation methods to value human health, some of which are discussed in the chapter. The authors suggest using the Value of a Statistical Life (VSL) for health wealth accounts, and provide some initial estimates for a small number of selected countries (not included in final IW country calculations).

Part III contains three chapters. Chapters 6 and 7 cover advances made in computing natural capital, while Chapter 8 describes how inclusive wealth can be used for project evaluation utilizing scenario analysis. Chapter 6 focuses especially on forest accounts, and explains improvements in calculations based on updated values for non-timber forest goods and services. These values were compiled from The Economics of Ecosystems and Biodiversity (TEEB) and Ecosystem Service Valuation Database (ESVD). Chapter 6 also recommends further research on generating a more complete computation of ecosystem services provided by forests, particularly with regard to carbon sequestration. For instance, countries could use the marginal contribution from a unit of forest maintained to inclusive wealth as a price for maintaining the forest for carbon sequestration.

Chapter 7 discusses several contentious issues involved in developing valuation estimates for ecosystem services, including methodologies for assuming benefit transfer across specific areas, or scaling up values to generate national-level figures. The final chapter of Part III provides an illustrative example for using the IW framework in project evaluation. The authors describe a model whereby a social cost-benefit analysis is computed for a project relating to investment in produced capital. The analysis makes an important contribution to existing project evaluation techniques by explicitly addressing the inter-linkages that occur across the various capital stocks. The chapter offers two case study examples, focusing on how infrastructure investments impact natural capital and health capital, respectively. Although the model looks retroactively at past projects, it offers insights into use for future scenario building that can inform investment decisions, in particular investments in produced capital.

Key messages

PART I

CHAPTER 1

Accounting for the inclusive wealth of nations: Key findings of the IWR 2014

- Chapter 1 utilizes the Inclusive Wealth Index per capita as an indicator of inter-temporal human well-being to assess nations' economic progress within the context of sustainable development. The chapter covers 140 countries over the time period between 1990 and 2010.
- Empirical evidence shows average positive growth in per capita inclusive wealth – and thus progress toward sustainable development – in 85 of the 140 countries evaluated (approximately 60 percent). Gains in inclusive wealth were in general lesser than those in GDP and HDI: 124 of 140 nations (89 percent) experienced gains in GDP, while 135 of 140 (96 percent) showed improvement in HDI over the same period.
- Human capital is the foremost contributor to growth rates in inclusive wealth in 100 out of 140 countries. In 28 countries produced capital was the primary contributor. On average, human capital contributed 54 percent of overall gains in inclusive wealth, while produced capital contributed 33 percent and natural capital 13 percent.
- Population growth and natural capital depreciation constitute the main driving forces of declining wealth per capita in the majority of countries. Population increased in 127 of 140 countries, while natural capital declined in 127 of 140 countries. Although both factors each negatively affect growth in wealth, changes in population were responsible for greater declines.
- Produced capital, the capital type for which by far the most exhaustive (and reliable) data exists, represents only about 18 percent of the total wealth of nations. The remaining capital types, which together constitute 82 percent of wealth (54 percent in human capital and 28 percent in natural capital), are currently treated as, at best, satellite accounts in the System of National Accounts.
- After adjusting for carbon damage, oil capital gains, and total factor productivity, the number of overall progressing countries drops from 85 to 58 of 140 counties (41 percent). Results show that all three factors negatively affected inclusive wealth in most of countries; of the three, total factor productivity adjustments had the greatest negative effect.

CHAPTER 2

The IWR and policy lessons

- Chapter 2 provides basic policy guidance for improving the inclusive wealth of a country based on the findings and lessons of the Inclusive Wealth Report.
- Countries striving to improve their citizens' well-being – and do so sustainably – should reorient economic policy planning and evaluation away from targeting GDP growth as a primary objective toward incorporating inclusive wealth accounting as part of a sustainable development agenda.
- Investments in human capital – in particular education – would generate higher returns for IW growth, as compared to investments in other capital asset groups, in countries with high rates of population growth.
- Investments in natural capital, in particular agricultural land and forest, can produce a twofold dividend: First, they can increase IW directly; second, they can improve agricultural resiliency and food security to accommodate anticipated population growth.
- Investments in renewable energy can produce a triple dividend: First, they can

increase IW directly by adding to natural and produced capital stocks; second, they improve energy security and reduce risk due to price fluctuations for oil-importing countries; third, they reduce global carbon emissions and thus carbon-related damages.

- Investments in research and development to increase total factor productivity, which decreased in 65 precent of countries, can immediately contribute to growth in inclusive wealth in nearly every country.
- Countries should expand the asset boundary of the present System of National Accounts (SNA), which currently captures only 18 percent of a country's productive base, to include human and natural capital, which are now measured only through satellite accounts, if at all.

PART II

CHAPTER 3

Human capital measurement: a bird's eye view

- Chapter 3 explores concepts and methodologies of measuring human capital for the purposes of inclusive wealth accounting.
- Measuring human capital can serve many purposes: it can help one better understand what drives economic growth; assess the long-term sustainability of a country's development path; measure the output and productivity of the educational sector; and facilitate informed discussions on social progress and well-being. In spite of this, human capital has not yet been included within the asset boundary of the SNA.
- The multifaceted nature of the concept of human capital creates substantial challenges for its measurement. By focusing on formal education and economic returns for individuals – rather than on human capital in general and all the benefits due to human capital investment – we can begin from an empirically manageable and practical point of departure.
- All existing approaches to measuring human capital have both advantages and disadvantages. However, the monetary measures generated from the cost-based and the income-based approaches should arguably be designated a "core" status. One reason for this is to enable direct comparison of figures with those for traditional produced capital covered by the SNA, the construction of which is a primary task of national statistical offices.
- Drawing on country experiences and international initiatives in the field of human capital measurement, one may conclude that an international trend is emerging toward an income-based approach, specifically the lifetime income approach. Estimates based on this approach can be used to assess the relative contribution of a range of factors (demographic, education, and labor market) to the evolution of human capital, and facilitate corresponding policy interventions.
- Despite significant progress having been made, there remain considerable challenges regarding data availability, and detailed methodological choices inherent in applying monetary measures. Further research should therefore be encouraged, including toward the compilation of quality data for use in international and inter-temporal comparisons; the construction of experimental satellite accounts, in order to better understand and reconcile the discrepancies between estimates based on the cost-based and the income-based approaches; and, eventually, toward incorporating human capital measures into the SNA in the future.