

Evaluation of the U.S. Government Millennium Challenge Corporation “Investing In People” Indicators

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Prepared for the
Millennium Challenge Corporation

Workshop in International Public Affairs
Spring 2010



ROBERT M. LA FOLLETTE
SCHOOL OF PUBLIC AFFAIRS
University of Wisconsin-Madison

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Table of Contents

Lists of Tables.....	iv
Foreword.....	v
Acknowledgments.....	vi
Executive Summary.....	1
Introduction.....	2
Evaluation Criteria.....	3
Evaluation of Existing Indicators.....	6
Data Issues.....	6
MCC Effect.....	6
Health Indicators: Immunization Rates and Public Expenditure on Health.....	7
Public Expenditure on Health.....	8
Immunization Rate.....	10
Education Indicators: Public Expenditure on Primary Education and Girls' Primary Education Completion Rate.....	14
Public Expenditure on Primary Education.....	14
Girls' Primary Education Completion Rate.....	20
Natural Resource Management Indicator: Eco-Region Protection, Access to Improved Water and Sanitation, and Child Mortality.....	23
Eco-Region Protection.....	24
Access to Improved Water and Sanitation.....	27
Child Mortality.....	29
Recommendation of New Indicators.....	32
Body Mass Index.....	32
Investment in Infrastructure: Roads and Nighttime Lights.....	33
Roads.....	35
Nighttime Lights.....	35
Potential Indicators.....	37
Occupational Training and Non-Formal Education.....	37
Presence and Makeup of Social Safety Nets.....	37
Conclusion and Recommendations.....	39
Works Cited.....	41
Appendix A: International Standard Classification of Education (ISCED).....	45
Appendix B: Status of Women Indicator.....	46
Need for a Status of Women Indicator.....	46
Findings.....	46
Recommendation.....	47
Appendix C: Natural Capital and Ecosystem Services.....	48
Endnotes.....	49

Lists of Tables

Table 1: Do Respective Investing in People Indicators Meet MCC Criteria?.....	4
Table 2: How Well Do Investing in People Indicators Fit Our Criteria?.....	5
Table 3: Recommendations	5

Foreword

Students in the Master of International Public Affairs (MIPA) program in the Robert M. La Follette School of Public Affairs at the University of Wisconsin–Madison produced this report for the U.S. Government Millennium Challenge Corporation (MCC), represented for this project by Sarah Rose, a Development Policy Officer at the MCC. The students are enrolled in Workshop in International Public Affairs, the capstone course in their graduate program. The workshop provides MIPA students the opportunity to improve their analytical skills by applying them to an issue with a substantial international component and to contribute useful knowledge and recommendations to their client.

The La Follette School offers a two-year graduate program leading to a Master of Public Affairs or a Master of International Public Affairs degree. In both programs, students develop analytic tools with which to assess policy responses to issues, evaluate implications of policies for efficiency and equity, and interpret and present data relevant to policy considerations.

The workshop provides practical experience applying the tools of analysis acquired during three semesters of prior coursework to actual problems clients face in the public, non-governmental, and private sectors. Students work in teams to produce carefully crafted policy reports that meet high professional standards. The reports are research-based, analytical, evaluative, and (where relevant) prescriptive responses to real-world clients. This culminating experience is the ideal equivalent of the thesis for the La Follette School degrees in public affairs. While the acquisition of a set of analytical skills is important, it is no substitute for learning by doing.

The opinions and judgments presented in the report do not represent the views, official or unofficial, of the La Follette School or of the client for which the report was prepared.

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May 2010

Acknowledgments

We thank the following people for their guidance and assistance in preparing this report: Sarah Rose, Millennium Challenge Corporation; Karen FASTER, our publication editor, for her editing and comments; and Professor Melanie Manion, our faculty advisor, for her mentoring and guidance.

Executive Summary

This report evaluates the five indicators the Millennium Challenge Corporation (MCC) uses to gauge a government's commitment to investing in people and recommends two additional indicators, Body Mass Index and Investment in Infrastructure. We evaluate current and recommended indicators based on the seven criteria the MCC uses to determine indicator quality and on two criteria we developed: concept validity and equity.

Of the existing indicators, the Immunization Rate indicator and the Access to Improved Water, Access to Improved Sanitation, and Eco-Region Protection components of the Natural Resource Management indicator perform well overall. The MCC should maintain these indicators in their current form. The Public Expenditure on Health indicator measures direct government investment in health but fails to account for improved health outcomes. We recommend the MCC keep this indicator but also consider output indicators or supplemental information whenever possible.

The remaining indicators provide valuable insight but should be improved to better capture concept validity. We recommend: transforming the Public Expenditure on Primary Education indicator into a combined indicator that includes educational quality-related indicators to provide a more robust measure for investment in primary education; adding the rate of girls' secondary education enrollment to the Girls' Primary Education Completion Rate indicator to better capture a government's commitment to empowering women and girls; and making Child Mortality its own indicator to better represent the diverse effects child mortality measures capture.

We evaluated four additional indicators with the potential to strengthen the Investing in People measurement category. Body Mass Index and Investment in Infrastructure performed well; we recommend the MCC adopt these indicators. Occupational Training and Non-Formal Education, and Presence and Makeup of Social Safety Nets require further development and cannot be used at this time. We also recommend adding a Status of Women indicator to the Ruling Justly category.

Introduction

The Millennium Challenge Corporation (MCC) is one of the newest U.S. foreign assistance mechanisms. Its mission is to improve aid effectiveness and have a “transformative” effect on poor countries by investing in countries that have the greatest potential for economic growth and poverty alleviation. Toward this end, MCC created rigorous criteria to evaluate countries’ aptitude to utilize grant funding. MCC evaluates each candidate country on how it rules justly, invests in the population, and practices economic freedom. Each of these categories are measured by a number of indicators the MCC identifies as relating directly or indirectly to poverty reduction in less developed countries.

The ongoing need for congressional support, coupled with its mission to ensure aid is delivered as appropriately as possible, requires the MCC to regularly review its evaluation criteria and their effectiveness. At the MCC’s request, we evaluate existing indicators for the Investing in People category, suggest and analyze new indicators, and provide comprehensive recommendations to improve Investing in People. We assess the five existing indicators—Public Expenditure on Health, Immunization Rates, Public Expenditure on Education, Girls’ Primary Education Completion Rate, and Natural Resource Management—under three main policy headings: health, education, and natural resource management. We then examine our new indicators on an individual basis and conclude with recommendations. Our report assesses these seven indicators against MCC’s seven evaluation criteria and two additional criteria we view as necessary to capture a government’s commitment to investing in people: equity and concept validity.

Evaluation Criteria

The MCC looks for indicators that:

1. use data developed by an independent third party,
2. utilize an analytically rigorous methodology and objective, high-quality data,
3. use publicly available data,
4. have broad country coverage and are comparable across countries,
5. have a clear theoretical or empirical link to economic growth and poverty reduction,
6. are policy-linked, i.e., measure factors that governments can influence within a two- to three-year horizon, and
7. have broad consistency in results from year to year.

We also require that the indicators meet two additional criteria:

8. equity: capture equitable distribution of services across the population, and
9. concept validity: fit the concept of “investing in people” as defined by the MCC and meet overarching goals of poverty reduction and sustainable economic growth.

The equity criterion evaluates how well government services or expenditures benefit all segments of the country’s population. Aggregate statistics for an entire country can mask inequities between urban and rural populations, different regions, ethnic groups, or genders. Existing inequities could be exacerbated as a country becomes wealthier if certain groups are excluded from resource access. Equitable distribution of services is critical considering the MCC’s style of funding large-scale infrastructure projects: if regional, ethnic, or other biases prevail in an MCC candidate country, the government may inequitably distribute MCC funding. Indicators may be implicitly more or less equitable: for example, protection of a public good such as natural resources is beneficial to everyone, but provision of government services is easily excludable to certain groups. Statistical disaggregation would provide greater insight into potential inequities. Should the MCC determine equity to be an important criterion, it could reference available household surveys and other supplemental information to further determine important regional, ethnic, or other in-country inequities.

Our concept validity criterion determines how well the reported measure matches the motivation behind the creation of each indicator. MCC’s intention for Investing in People indicators is to “measure investments in people, particularly women and children, by assessing the extent to which governments are promoting broad-based primary education, strengthening capacity to provide quality public health, reducing child mortality, and promoting the sustainable use of natural resources.”¹ Furthermore, concept validity encompasses MCC’s overarching goals promoting poverty reduction and sustainable economic growth. In our report we compare what the

indicator actually provides with the development goal associated with that indicator. This broad definition of concept validity allows for flexibility to determine how well each indicator fits our measurement scale.

Table 1 and 2 summarize our assessments of each indicator measured against each of the seven MCC criteria and our equity and concept validity criteria. Table 3 summarizes our recommendations.

Table 1: Do Respective Investing in People Indicators Meet MCC Criteria?

	Public Expenditure on Health	Immunization Rate	Public Expenditure on Primary Education	Girls' Primary Education Completion Rate	Natural Resources		
					Eco-Region Protection	Water and Sanitation	Child Mortality
Independent third party	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Data collection methodology: rigorous and high quality	Partially	Partially	Partially	Partially	Partially	Partially	Partially
Publicly available	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Broad country coverage	Yes	Yes	Partially	Partially	Yes	Yes	Yes
Clear links to economic growth	No	No	No	Yes	Partially	Partially	Partially
Policy-linked (two- to three-year horizon)	Partially	Yes	Partially	Yes	Yes	No	Yes
Broad consistency	Yes	Yes	Yes	Yes	Yes	No	Yes

Source: Authors Scale: Yes, No, and Partially "Partially" describes an indicator that does not fully meet the MCC criteria.

Table 2: How Well Do Investing in People Indicators Fit Our Criteria?

	Public Expenditure on Health	Immunization Rate	Public Expenditure on Primary Education	Girls' Primary Education Completion Rate	Natural Resources		
					Eco-Region Protection	Water and Sanitation	Child Mortality
Concept Validity	Fair: captures vital input into health systems but fails to measure how the funding is applied; reflects country ownership through flexibility	Very good: internationally recognized measure with direct links to improved health	Poor: data measure financial commitment but fail to capture any qualitative aspects of education	Fair: gender gap more evident in secondary school; might not adequately reflect government commitment to girls' education and women's empowerment	Fair: not really an investment in people, but provides indirect benefits, promotes environmental sustainability	Good: indirectly linked to poverty reduction, improves overall well-being of population	Good: measures overall poverty rates; improvements in this measure generally mean improvements in society
Equity	Fair: some countries receive outside assistance, aggregated data may mask regional inequities	Fair: targets children in first year of life but does not directly improve health of population over target age; may mask inequities between rural/urban populations	Fair: data measure public school enrollment of children, not quality of schooling	Good: specifically measures girls to account for gender inequities, but may mask inequities between rural/urban populations, ethnic groups, etc.	Very good: benefits entire population	Very good: reaches most people when expanded to new communities	Fair: may mask inequities between rural urban populations, ethnic groups, etc.

Source: Authors

Scale: very good, good, fair, poor

Table 3: Recommendations

Existing Indicators	Public Expenditure on Health	Immunization Rate	Public Expenditure on Primary Education	Girls' Primary Education Completion Rate	Natural Resources		
					Eco-Region Protection	Water and Sanitation	Child Mortality
	Keep (but consider output indicators and supplemental data when possible)	Keep	Adjust*	Adjust*	Keep	Keep	Adjust*
Potential Indicators	Body Mass Index	Investment in Infrastructure		Occupational Training and Non-Formal Education	Social Safety Nets		
		Roads	Nighttime Lights				
	Use	Use in combination	Use in combination	Needs further development [†]	Needs further development [†]		

Source: Authors

*Adjust means that we recommend changing the respective variable to better capture investments in people. Explanations of adjustments can be found in the body of the report.

[†] Needs further development means that presently the indicator is not ready for MCC usage but may be ready in the future. Details are described in the body of the report.

Evaluation of Existing Indicators

This section analyzes existing indicators and provides recommendations to keep or adjust them. We do not recommend dropping any indicator.

Data Issues

While we examine each indicator individually, we discovered certain commonalities across all indicators. First and foremost, the data sources used for each indicator are the best available. We do not find or recommend that any new data source could replace those in use. We do find, however, all of the indicators fail to fully meet certain data quality criteria, mainly due to the lack of statistical collection capacity in many developing countries. We analyze especially problematic data concerns in detail in our evaluation of individual indicators, while the list below identifies common weaknesses across indicators. Specifically, we found that most of the data, to varying degrees,

1. lack consistent collection methodologies across countries and/or years,
2. have incentives for false reporting or discrimination,
3. are not comparable over time,
4. are missing across countries and/or years,
5. lack clear processes for smoothing data, such as trend analysis and techniques to account for missing data,
6. are interpreted differently among candidate country governments, surveying agencies, and/or the MCC.

MCC Effect

In addition to evaluating how well an indicator measures a country's performance in a certain area, it is important to consider the role an indicator may play in providing an incentive for countries to perform better in that area to receive future MCC funding. Studies suggest the MCC's performance indicators have had an additional positive impact in many countries, in what several studies have identified as the "MCC effect."² Specifically, in 2006 a Harvard University working paper reported "potential recipients of MCC funds improve 25 percent more indicators after the MCC was created than before it."³

MCC's compilation of data from diverse institutions into one comprehensive dataset created a highly visible and transparent process with definitive goals and standards for countries to meet. These indicators objectively show how a country ranks compared to its peers and encourages governments to improve their performance in certain areas to improve their likelihood of securing MCC funding as well as improving their image to other donors, the international community, and their own population. For example, after introducing the "Days to Start a Business" indicator (since combined with "Cost

of Starting a Business” into “Business Start-Up”), many MCC candidate countries introduced reforms to streamline the process of starting a business.⁴

These findings support the continued use of Investing in People indicators despite inherent weaknesses related to the data. The existence of indicators alone—ones that are transparent and have clear standards and goals—incentivize countries to improve their rankings. Our findings also imply that when considering existing or additional indicators, MCC should examine not only the role of the indicator in measuring a country’s performance in a certain area but also the value of the indicator in encouraging countries to improve performance.

Health Indicators: Immunization Rates and Public Expenditure on Health

Developing countries have varying health-care priorities, from strengthening health systems’ capacities to reducing the spread of HIV/AIDS. The most ubiquitous barrier to health care in underdeveloped countries is cost: whether costs are the burden of the family unit, the state, or an outside aid agency, there are never enough funds to address the needs of the entire population.⁵ In addition to cost, other barriers to health care that exist in developing countries vary greatly across nations.

Some countries face infrastructure barriers including lack of health facilities, transportation, and sanitation. Countries lacking health-care facilities and roads often fail to provide adequate health-care access to rural populations. Lack of physical infrastructure to provide appropriate nutrition and sanitation services to the population compounds the risk of illness and encourages the spread of disease.⁶

Social and educational obstacles to health care are prevalent in developing nations. Social and religious barriers may keep women from accessing contraceptives, prenatal care, and other forms of reproductive health care. This is especially true if there is no cost-free access: a woman’s husband or father may not prioritize her health or see the need for new services. In some countries, female genital mutilation is common and a severe, additional risk to women’s health.⁷

Lack of education affects residents’ abilities to keep themselves healthy. The most prevalent example of this is little understanding of HIV/AIDS transmission. Other diseases are transmitted through contact or unsafe sanitation practices. Education on the risks of sexual contact, direct contact with an ill person, water purification techniques, and proper food preparation techniques can deter unsafe behaviors. Governments in developing countries rarely provide comprehensive health education to the public.

The United Nations and the World Health Organization (WHO) established several global health-care priorities. Some priorities address factors that place humans at risk

for disease, such as poor sanitation and malnutrition. Other concerns focus on epidemic diseases, such as H1N1 influenza, malaria, or HIV/AIDS.⁸ Specific priorities may vary from country to country and are important for international funders to acknowledge so that resources are used appropriately. International trends indicate that initiatives to improve nutrition, water quality, living quarters, access to medical services, and disease prevention are policy priorities.

An appropriate proxy for health-related investments in people should address one or more of the barriers to health care in developing countries. An MCC health-related indicator should be flexible enough to adapt to the specific policy priorities of a country while staying within broad international health-care trends.

Public Expenditure on Health

The Public Expenditure on Health indicator is the ratio of health-related public spending to gross domestic product. Expenditure on a particular public good is a measure easily controlled by governments, because it is an input. Health-related spending often has a long lag time until the outputs (such as reduced infant mortality and more medical facilities) become readily apparent, so an input measure is an appropriate indicator for the MCC. The length of the lag may vary among health-related spending initiatives but is likely to surpass the MCC's two- to three-year threshold.

Data on health-related spending come from the WHO and gross domestic product data are from UN Account Statistics. The WHO compiles this variable as part of its national health accounts, which trace health-related spending flows from funding sources to providers to beneficiaries of services. According to the WHO, national health accounts measure “the sum of outlays for health maintenance, restoration or enhancement paid for in cash or supplied in kind by government entities, such as the Ministry of Health, other ministries, parastatal organizations or social security agencies ... transfer payments to households to offset medical care costs, and extra budgetary funds to finance health services and goods.”⁹

For many countries, the national health account framework has been in place for more than 10 years. The WHO collects comprehensive data from a variety of sources to create the most accurate measures for national health accounts. These sources vary by country, but may include the Organisation for Economic Co-Operation and Development; the International Monetary Fund; reports, statistics, and data published by national governments; non-governmental organization reports; central bank reports; and academic papers.

Strengths

The Public Expenditure on Health indicator meets five of the MCC's evaluation criteria. An independent third party publishes the data, expenditure measures are publically available, and national health accounts feature broad country coverage and consistency.¹⁰ Since this measure is an input, it is policy-linked and provides ample opportunity for a country to improve health-related spending.

Health-related government spending is a broad input measure that can be used to reflect a country's needs or preferences. This flexibility allows a domestic government to determine how to spend money on health care and respond to the desires of the population. A country's infusion of health-care funds is an investment in people and as such meets the criterion of concept validity.

Although the WHO collects health expenditure data from a variety of sources, it validates them across sources and uses those it determines most reliable. The WHO's framework for producing national health accounts of the flow of health-care spending is consistent across countries and years, and recent and relevant data are made available. In addition, the WHO tracks actual spending as opposed to "budgeted" spending to gain the most accurate measure possible.¹¹ Each country's ministry of health reviews its national health account that the WHO completes, which improves accuracy and increases a nation's sense of ownership of the data analysis and results.

Weaknesses

The Public Expenditure on Health indicator fails to meet two of the MCC's criteria: it does not represent high-quality data and does not have clear links to economic growth. First, there are several data quality issues related to Public Expenditure on Health indicator. Especially problematic data issues for this indicator include incentives for false reporting and varied interpretations of related terms. The WHO collects data from many sources, and it is unclear about which data are collected from which sources and about the accuracy of each country's national health account.¹² Statistical capabilities differ widely across countries, so the source and accuracy of national health accounts are likely to vary as well. The WHO acknowledges these limitations.¹³

Regarding clear links to economic growth, health-related spending may have a positive impact on health care and may improve labor productivity and human capital. While increased health-care spending may thereby have a positive effect on economic development, there is no clear, direct link. The effect of health-related spending on development varies with how and how well a government uses the funds.

Also, this indicator may not genuinely reflect a national government's efforts to invest in its population. National health accounts factor in external sources of funding, resulting in a bias that favors countries that receive external grants. Those countries that receive grants for health-care programs may artificially score higher than the rest of the income-level group, and vice versa.

The Public Expenditure on Health indicator has the potential to mask inequalities in a country. Because health-related spending is such a broad measure, it does not reveal which segments of the population receive the associated health benefits. For example, financial resources might be used to build more hospitals and other medical facilities in urban regions. This creates a relative disadvantage to people living in rural areas. The Public Expenditure on Health indicator does not meet our criteria of being equitable.

The most significant weakness of this indicator lies in the unproven relationship between health spending and better health.. The WHO claims that health expenditure only yields positive output when “the money is managed efficiently.”¹⁴ Many MCC beneficiaries suffer from corruption and poor government structure. These nations are likely to have difficulty in efficiently managing health spending, and more input may not equal more output.¹⁵ This lack of efficiency is a problem for any spending “input” indicator and challenges The Public Expenditure on Health indicator's concept validity. As with potential inequities, supplemental data and output indicators help the MCC mitigate this concern.

Recommendation

Health spending reflects a flexible input variable that countries can alter quickly and use to address the specific needs of their populations. It represents direct government investment in its people. However, the governments and public structures of less-developed countries struggle with the efficient use of public funds. Our team believes that Public Expenditure on Health indicator is the best broad, health-related indicator available. However, due to the difficulties of using an input indicator, possible inequities, and data source inconsistency, we recommend the MCC take output indicators and supplemental data into consideration whenever possible. We suggest accounting for Body Mass Index (one of our proposed potential new indicators) and child mortality as the additional output indicators, as well as using any supplemental information that is available on a country-to-country basis.

Immunization Rate

The Immunization Rate indicator measures the rate at which two vaccinations are administered in the birth to one-year target population. The WHO identifies the rates of diphtheria tetanus toxoid and pertussis (DPT3) series and measles

vaccinations as significant indicators of successful immunization programs. The WHO and UNICEF collect these data in a joint effort.

Immunization rates of DPT3 and measles measure coverage among 1-year-olds across a population. Data are collected from household surveys and health-care facility administrative data. Estimates are created using census projections to determine the total number of children in the birth to 1-year target population. For this measure, the WHO does not use data smoothing; it uses household surveys to authenticate reported data. The WHO also considers biases among sources when there are multiple data sources to choose from and incorporates information from local experts to provide a context for data trends. The WHO acknowledges that “one of the perceived weaknesses of the estimates is related to the subjective nature of [its] methods.”¹⁶

The WHO has identified vaccinations as one of the easiest and cost effective ways to control diseases and prevent infant mortality. Vaccinations prevent diseases as opposed to treating them, and therefore minimize unnecessary suffering, illness, and death. Furthermore, cost-benefit analysis shows that the return for each \$1 of vaccines is anywhere from \$2 to \$27.¹⁷ For these reasons, immunizations are a popular method of disease prevention worldwide and the MCC has elected to utilize this indicator. The diseases these vaccinations prevent continue to be fatal in developing countries.

Immunization rates represent a health-care output, as opposed to an input. Few exogenous factors affect the delivery and availability of vaccines, and national governments are able to influence the indicator through spending and other programs. Since vaccination administration requires some semblance of a health-care system to exist, it serves as an excellent proxy for basic health-care infrastructure as well.

Strengths

The Immunization Rate indicator meets five of the MCC criteria. It is developed by an independent third party (WHO and UNICEF). The WHO measures vaccination rates across many countries and the variables are generally consistent across time. Furthermore, vaccination rates are policy-linked: once the necessary infrastructure is in place, the cost of increasing immunization rates is directly linked to the variable cost of each vaccination itself.

The WHO praises and encourages immunization efforts worldwide due to the proven high return rate and effectiveness. This indicator is internationally recognized as an important investment in the health of a nation’s population and broadly represents health principles worldwide. The WHO provides research and resources to assist governments in implementing or increasing immunization systems.¹⁸

Immunization rates are relatively easier to measure than other MCC indicators. A single vaccination is the same in every country, unlike figures measured in local currency. For example, one vaccination in Zimbabwe is equivalent to one vaccination in Uganda. A simpler measurement method allows for fewer errors: measurement continuity establishes data quality. Additionally, because each vaccine represents a tangible item, tracking the number of administered vaccines is easy.

Furthermore, the data are collected annually. Both the data and the survey are publically available on the WHO's website. The survey is clear and straightforward.¹⁹ The WHO and UNICEF publish estimates of vaccination rates in addition to reported estimates. While neither organization has published the exact methodology for determining the adjusted dataset, it appears that WHO and UNICEF are engaged in some vetting or data smoothing process to detect mistakes.²⁰

The Immunization Rate indicator meets the concept validity criterion, serving as an excellent proxy for Investing in People. Cost-benefit analysis and the WHO's commitment to vaccination programs worldwide indicates that vaccinations are an excellent investment in a population's health. Immunization rates are a cost-effective reflection of the "investing in people" measure. Aside from immunization rates having a high return on investment and being a cost-effective method of disease control, they represent a government's commitment to providing health care for children. High immunization rates indicate that health care is financially and locally accessible and health-care providers exist in reasonable proportions to the population. A commitment to preventative care reflects a commitment to a higher quality of life. If a government commits funds to immunizing infants, it likely funds other social and health-related programs that also improve the lives of the population.

Weaknesses

Immunization rates do not meet two of the MCC's criteria. The data collected are imperfect, featuring many of the common data issues we have noted. For example, there are incentives for false reporting. Similarly, despite the WHO and UNICEF publishing estimates in addition to the actual dataset, the process for estimating the dataset is unclear. Moreover, academic literature and quantitative analysis do not directly link immunization rates to economic growth. There is an indirect relationship between immunization and economic development, however. Immunizations prevent diseases that weaken a population and decrease labor productivity.

Equity is also a concern with this indicator, inherent to implementation of a vaccination program. Vaccines must be transported in refrigerated chambers, and some developing countries may lack the infrastructure to transport vaccine doses efficiently. Furthermore, a trained health-care provider must receive the vaccinations

to administer them to the specified target population. If the appropriate infrastructure is not already in place, or only allows transport to urban areas, expanding a vaccination program to rural areas may be difficult. Because the data are not disaggregated by region or ethnic group, they may mask inequities. If a country scores poorly on this indicator, the country is clearly not performing to MCC's standard, regardless of the possible inequitable distribution of vaccination services. However, when a country performs well on this indicator, MCC should pay careful attention: an average to good score can indicate good performance and policy initiatives on the part of the country or severe equity issues.

Equity concerns are compounded because vaccinations target a well-defined target population. This indicator measures a service that improves the health and welfare of children aged 1 year and younger and protects people into adulthood. On the other hand, immunizations do not protect people who are past the target age. For example, if a government refocuses efforts from treatment to prevention of measles, infants receiving the vaccine benefit into their adult lives, but an unvaccinated adult who contracts measles may not receive treatment. Government revenues and resources spent on increasing immunization rates do not directly affect the larger population. An indicator that focuses on one portion of the population is appropriate in the MCC's Investing in People category as long as Investing in People, as a whole, offers a balanced snapshot of the entire population.

Bias is associated with this indicator: 76 percent of MCC grant recipients in 2009 benefited from the GAVI Alliance, an organization that provides financial assistance for immunization programming.²¹ The countries that receive external assistance to provide immunizations are likely to have higher scorecards than countries that do not benefit from GAVI's assistance. In this instance, the higher score does not reflect better efforts to improve vaccination rates. The MCC may want to consider what percentage of countries that perform above the median on the Immunization Rate indicator have also received GAVI or other international assistance.

Recommendation

Immunizations have proven returns and address barriers to health care in developing countries. In addition, the Immunization Rate indicator is conceptually valid because it indicates access to health care for young children and basic health-care-system infrastructure. MCC should maintain immunization rates as a health-care indicator because it represents a realistic health-care intervention in developing countries.

Education Indicators: Public Expenditure on Primary Education and Girls' Primary Education Completion Rate

More than 75 million children—the majority in developing countries—lack access to primary education.²² Since the World Conference on Education for All in 1990, many countries have removed school fees for primary school, but in countries that did not, fees are a significant barrier for poor people. Even when primary education is free, costs often remain in terms of supplies, uniforms, or unofficial fees and may still pose a barrier to many families.

Parents often expect their children, especially their daughters, to stay home from school to help around the home, to take care of younger siblings, or to marry and begin having children at a young age; in addition, in some cultures it is taboo for girls to attend school. Barriers to girls' education are even greater if school fees are required: many families believe educating their sons is a better investment than sending their daughters to school.²³

Even if access to education exists, education may be of poor quality and offer little benefit to students in terms of basic literacy, math, and other skills. Lack of adequately trained and experienced teachers, lack of textbooks, poor school facilities, and ineffective teaching methods all contribute to poor educational quality in developing countries. Parents may choose not to send their children to school if they perceive a poor quality of education and feel their children's time would be better spent on other activities. Importantly, students who do attend school but receive a low quality of education are not properly equipped with the skills they need to integrate themselves and their country into the global economy.

To fully capture a government's commitment to investing in people in terms of education, education indicators should address access to education—especially for girls—and educational quality.

Public Expenditure on Primary Education

The MCC's Public Expenditure on Primary Education indicator, added in 2007, seeks to “gauge the extent to which governments are currently making investments in the education of their citizens,” measuring the total expenditures on primary education by government at all levels as a percentage of gross domestic product.²⁴ The Public Expenditure on Primary Education indicator uses annual UNESCO Institute for Statistics data. If these are not available, MCC requests information directly from the country as a secondary source. It requires countries to provide all government—including sub-national—and consolidated public sector expenditures, excluding donor funds when possible. In cases where countries report data directly, the MCC asks candidate countries to measure expenditures for primary education according to the International Monetary Fund's definition of primary education.²⁵

(See Appendix A for the full International Standard Classification of Education definition.)

Strengths

The Public Expenditure on Primary Education indicator provides useful insight into a country's willingness to fund education, and the Institute for Statistics is the best agency to collect these data. The indicator fully meets three of MCC's seven criteria for indicator quality—-independent third party, use of an analytically rigorous methodology, and objective and high-quality data that are publicly available. It partially meets the criterion of broad country coverage and comparability across countries: data are comparable but country coverage is not very broad due the fact that countries are not required by the UNESCO Institute for Statistics to report data annually.

First, most of the data for this indicator come directly from an independent third party: the UNESCO Institute for Statistics (UIS). UNESCO established the institute in 1999 as an independent body in response to concerns regarding the “statistical independence and integrity” of UNESCO data. To allow for independence and autonomy, UIS is based in Montreal, Canada. Since its inception, the institute has proved its independence and greatly improved the data quality of UNESCO statistics.²⁶

This indicator also meets MCC's criterion that data collection be analytically rigorous and of high quality. The UIS has a highly developed data collection process in which countries are provided a handbook explaining how to collect reliable data. The institute calls on countries to create committees of education-related government officials to ensure that data collection is comprehensive, accurate, and reliable.

Third, data are publicly available; easy-to-read methodology and statistical tables are fully accessible to any researcher. The UIS publishes updated annual surveys, and countries fill them out voluntarily to ensure data are updated regularly.

Fourth, the data available through the UIS are likely to be comparable across countries. UNESCO is the “only universal organization entitled, by virtue of its Constitution, to ask Member States to provide it with statistical data.” It is also charged with collecting data to monitor the progress of Education for All and the Millennium Development Goals.²⁷ The UIS has done extensive work to ensure that the definition of primary education allows for both flexibility and consistency in its reporting and collection. The institute requires countries to follow the International Monetary Fund's International Standard Classification of Education standards to define primary education. While these defined levels of education are scheduled to be reviewed and redefined in 2011, the classification has not identified primary

education as a factor likely to be changed.²⁸ Therefore, the ongoing preservation of the definition creates consistency within the reporting framework.

When data are not available through the UIS, MCC staff ask countries that seek funding to provide them information directly, and the MCC calculates their Public Expenditure on Primary Education indicators. These are the only data MCC collects directly from countries for this indicator. During the data collection, the MCC requests countries to provide gross domestic product estimates, all government expenditures, and data on the consolidated public sector, excluding donor funds if possible. MCC cross-checks the gross domestic product information with World Bank and International Monetary Fund numbers and revises historical data as better data become available.²⁹ This process enables the MCC to fill in gaps in UIS data. This collection process further benefits the MCC because the information it receives directly from countries also provides supplemental information the MCC can use in its overall decision-making process to the extent that it is useful.

The Public Expenditure on Primary Education indicator provides useful macro-level information on educational investments. It attempts to identify a country's financial commitment to its entire primary education system, giving insight into rural and urban education funding. This indicator appropriately captures the overall input of funds into primary education.

Weaknesses

UIS data are the best available to the MCC. However, the Public Expenditure on Primary Education indicator only partially meets the criterion of having links to policies a government can influence in two to three years, and it fails to meet two of the MCC's criteria—linkages to poverty reduction and economic development and broad country coverage. It also fails to meet our equity or concept validity criteria.

First, this indicator is policy-linked in terms of being able to adjust expenditures on primary education within two to three years. Realistically, a country could increase funding within two to three years, but this increased funding does not necessarily translate into better education policy or the MCC's larger development goals. Similar to the health expenditure indicator, the effects of increased expenditures on the quality of education will likely take years—sometimes decades—before improved education and its impacts on economic growth could be fully measured. Consequently, this measurement only partially meets MCC criteria.

Second, while studies show education can improve economic growth, results tend to be more significant when measuring the quality of education instead of the quantity. “Educational quality—measured by what people know—has powerful effects on

individual earnings, on the distribution of income, and on economic growth. The educational quality in developing countries is much worse than educational quantity (school enrollment and attainment), a picture already quite bleak. Just providing more resources to schools is unlikely to be successful—improving the quality of education will take major changes in institutions.”³⁰ This indicator does not have a sufficiently strong link to economic growth and poverty reduction. It speaks to the financial resources committed to education, but does not provide any insight into the outcome of overall schooling. In short, the Public Expenditure on Primary Education indicator fails to provide useful information associated with poverty-reduction and economic growth.

Third, the data have a number of broad country coverage problems in terms of who reports data and when. The data UIS collects each year are not necessarily from the same countries, and because reporting is voluntary, the sample size of countries providing data is limited. The methodology and collection requirements are rigorous, but this stringency limits the data countries can give the UIS. In 1998, UNESCO published the Statistical Information System of Expenditure in Education administration manual, which outlines how it collects and measures education statistics. The beginning of the manual states: “apart from the budgetary data of the national ministry for education, there is at present no way in which the total financial resources deployed in education by all concerned can be grasped. The information coming from other sources is either precise but fragmentary, containing gaps or incomplete, or so approximate or theoretical that it is unusable ... Thus many available data are invalidated by being unreliable and incomplete.”³¹ The UIS and the MCC also collect slightly different data using slightly different measurements, creating data inconsistencies. Data gaps remain even after the incorporation of two different datasets: in 2010, six of the 56 lower-income countries did not have data for this category and six of the 31 lower middle-income countries had no data for this category in 2010.³²

The Public Expenditure on Primary Education indicator also fails to meet our equity criterion. It does not adequately measure funding disbursement. Specifically, it does not measure how much funding is directed to urban versus rural schools, whether funding is determined by school size, or if certain districts receive more funding than others. This indicator may also unintentionally be biased toward countries with homogenous populations—it may mask inequities within countries when ethno-linguistic fractionalization limits the ability to provide adequate schooling (i.e., language limitations). In short, this indicator does not take into account any equity factors.

The most significant weakness of the Public Expenditure on Primary Education indicator, however, is that it fails to meet the criterion of concept validity. Concept validity for this criterion assumes that the intent behind the indicator is to identify

both the depth and width of a country's educational system. While the indicator captures the scope—how much funding is directed toward education—it does not capture any depth—i.e., how effective the education is, who is being taught, and/or how well students are learning. In its current form, the MCC's education indicator does not capture any type of quality-related information about primary education. It meets the MCC goal of gauging financial commitment to education, but it ultimately fails to say anything about how well a country's educational system is functioning or how well children are learning. Measuring the impact greater funding has on the quality of education is not easy but is extremely important for capturing the indicator's concept validity. For this indicator, concept validity would mean that the Public Expenditure on Primary Education indicator would in some way measure a quality-related factor associated with increased funding for education. The MCC reached similar conclusions when it sought to identify a quality-related indicator in 2007. It reported: "if appropriate measures were available, it would be useful to have additional information on the extent to which government inputs are being translated into improved educational quality and learning outcomes ... Without accountability systems, trained teachers and adequate supplies, appropriate incentive structures, and a range of other policies and institutions, more schooling often does not translate into better learning outcomes ... the best available evidence suggests that the effect of improved education quality on economic growth is significantly larger than the impact of additional years of schooling."³³

Recommendation

While failing to meet a number of MCC and our criteria, the Public Expenditure on Primary Education indicator remains an important indicator and should be kept. Education affects economic growth and is an important factor when considering any type of development aid. If measured correctly, education could be a very useful indicator in the Investing in People category. Research shows that well-managed and well-executed public expenditure on education can increase economic growth.³⁴

However, this indicator has significant data weaknesses. Most importantly, it does not capture an accurate picture of the quality of education and fails to meet our concept validity criterion. The MCC could greatly improve this indicator by considering education quality-related factors. Since the MCC is already compiling some of its own data, it could reasonably reconsider which variables it uses to measure this indicator. The MCC and the World Bank acknowledge that quality-related indicators would be more useful than just expenditure measures.³⁵

The World Bank has identified specific variables that may measure education quality:

- Teacher quality: "The most consistent finding across a wide range of investigations is that the quality of the teacher in the classroom is one of the most important attributes of schools."³⁶ While direct data are not

available on teacher quality, close substitutes would be percentages of trained teacher measures and teacher-to-student ratios.

- Grade repetition rates: Evidence suggests higher cognitive skills in primary school lead to lower rates of students repeating grades.³⁷
- Testing rates: Higher testing scores indicate higher cognitive skills.³⁸

These indicators do not fully account for the measurement of education quality, however. The World Bank also identified factors that may influence educational quality but are not always easily measurable: family influence, textbook availability, and teacher salaries.³⁹ The UIS already requests data on grade repetition and trained teachers or student-to-teacher ratios. These data would still fail to meet the MCC data-specific criteria challenges as explained with the primate education expenditures indicator. However, expanding the dataset may provide a more holistic picture of a country's education system. The UIS does not request or publish information on testing rates, and a supplemental, reliable dataset is not available at this time, but the MCC could request this information from candidate countries to use as supplemental data. Again, the same data challenges would be encountered as with the Public Expenditure on Primary Education indicator as it stands now. However, the MCC could use these additional variables to supplement the expenditure information it receives.

Creation of a separate indicator for quality-measures is not the best solution. The expenditure measure provides the most data for education and demonstrates useful insight into the extent to which a country is investing in education. We also must assume a correlation between this input measure and the outcomes; therefore, creation of two separate indicators may be *too* informative (i.e., one measure might capture qualities of the other measure).

The MCC could strengthen this indicator, however, by developing a scaled model that accounts for other UIS variables such as repetition rates and the percentage of trained teachers. The process would resemble the way the MCC measures the Natural Resources Management indicator, which has sub-indicators that are weighted and measured to calculate the composite indicator. As with the Natural Resources Management indicator, each sub-indicator would be allocated a percentage and the composite would be measured as an aggregate of all the percentages. The MCC could develop this measurement system itself or outsource the work. Either way, the process would remain transparent and still meet MCC criteria. Development of sub-education indicators would create a more holistic picture of a country's commitment to the quality of education instead of just its financial commitment.

Retention of the Public Expenditure on Primary Education indicator is important for a number of reasons. Improved educational systems are linked to poverty reduction and economic growth, and countries should be held accountable for their commitments to improving education. The indicator's use of data, however, does not accurately capture a government's commitment to investing in people because it fails to address educational quality. Therefore, we recommend that the MCC pursue opportunities to strengthen to this indicator by adding quality-related variables to provide a more holistic assessment of educational quality.

Girls' Primary Education Completion Rate

In 2005, the MCC replaced its Primary Education Completion Rate indicator with the Girls' Primary Education Completion Rate indicator to reflect the view that women's empowerment—and specifically girls' education—is a key ingredient of economic growth and poverty alleviation. Educating girls increases their labor productivity and potential wages, gives them more control over their bodies, and enables them to raise healthier children. The purpose of the Girls' Primary Education Completion Rate indicator is to measure a “commitment to investing in basic education for girls in terms of access, enrollment, and retention.”⁴⁰

Because accurate primary completion data are difficult to collect, the indicator measures a proxy for primary completion: gross intake ratio of girls in the last year of primary school, measured as the total number of girls enrolled in the last grade of primary school (regardless of age) minus the number of girls who are repeating the last grade of primary school, divided by the total female population of the standard entrance age of the last grade of primary school.⁴¹ This measure more closely represents “an upper-bound estimate of the actual female primary completion rate” because it does not account for students who drop out in their final year.⁴²

The UIS compiles the data for this indicator. As with primary education expenditures reporting, the institute requests national governments to voluntarily report data for the gross intake ratio for the last year of primary school. Initially reported by individual schools, these data come from school registers and are then aggregated by government level or geographic region until they construct national education statistics. Household survey data are primarily gathered by government agencies, although occasionally universities, non-governmental organizations, or other institutions collect these data. Census data are from national governments. UIS uses household survey data and census data to check school register data for consistency.⁴³

Strengths

The Girls' Primary Education Completion Rate indicator meets five of the MCC criteria and partially fulfills the criteria for rigorous methodology and high quality data and for equity. First, the UIS collects the data with methodology similar

to that for collecting primary education expenditures data. As with the Public Expenditure on Primary Education indicator, the UIS meets the MCC criteria of agency independence and public availability of data.

For the most part, this indicator uses a rigorous methodology and high quality data. There is room for false reporting because countries report these data to the UIS and actors responsible for reporting these data at all levels—including households, individual schools, and national governments—could have incentives to over- or underreport the number of girls completing primary school.⁴⁴ However, the UIS has a rigorous process of validating school register data by comparing it to household surveys and census data.

Importantly, an infrastructure for collecting the data for this indicator already exists in almost all countries, as the enrollment figures that come from school registers are necessary at all schools, and ministries or departments of education must compile enrollment data into national figures for their own purposes.

Girl's education has a strong theoretical and empirical relationship to economic growth and poverty reduction. The MCC cites research demonstrating a “strong positive correlation between girls’ primary education and accelerated economic growth, slower population growth, higher wages, increased agricultural yields, and increased labor productivity.”⁴⁵ Yet, for a number of reasons, in many developing countries girls are educated less than boys. Failure to prioritize girls’ education has a high cost for many developing countries. A 2008 study estimated the total economic cost to low- and low-middle income countries for failing to educate girls to the same level as boys as \$92 billion per year, a significant amount considering the total annual foreign assistance to these countries from developed countries is \$103 billion.⁴⁶

This indicator is also policy-linked. Governments can influence many of the barriers to girls’ primary education in two to three years by eliminating school fees, improving school facilities, and providing vouchers to families to send their daughters to school, for example. Improvements in educational quality, however, would likely require more time to achieve demonstrable impacts, as would policies to raise awareness of the importance of girls’ education. For the most part, however, governments have a significant ability to influence girls’ primary education completion rates.

Overall, the Girls’ Primary Education Completion Rate indicator performs well as a proxy for a government’s commitment to investing in girls’ basic education in terms of access, enrollment, and retention. As we discuss in the primary education expenditures section, a primary concern regarding education indicators in general is the difficulty in measuring the educational benefit the student actually receives. Consequently, the MCC should measure girls’ primary school *completion* rates, rather than enrollment rates.

School enrollment rates provide a good measure of access to education but do not represent actual attendance. Many students technically enrolled in school frequently miss class and fall behind, especially girls. The rate of girls' primary education completion in a country demonstrates the extent to which barriers preventing girls from attending school have been removed.

Finally, this indicator captures the idea of equity by specifically addressing gender inequities in primary school.

Weaknesses

First, the Girls' Primary Education Completion Rate indicator has relatively weak country coverage: 17 MCC 2010 candidate countries are missing data for this indicator.⁴⁷ Unlike the Public Expenditure on Primary Education indicator, the MCC does not ask nations to provide missing data.

Second, while the Girls' Primary Education Completion Rate indicator is a good proxy for a government's commitment to girls' basic education, it does not have substantial concept validity in terms of evaluating a government's commitment to overall gender equity and women's empowerment: primary education alone is not enough to eliminate gender disparities. Post-primary education has greater payoffs than primary education in improving women's "health and well-being, position in family and society, economic opportunities and returns, and political participation," the *UN Millennium Project Task Force on Education and Gender Equality* reported in 2005.⁴⁸ Female workers receive higher returns to secondary education (18 percent) than male workers (14 percent), but actually receive lower returns to primary education (13 percent) than male workers (20 percent).⁴⁹ In this light, an indicator measuring girls' post-primary education would be a better proxy for a government's commitment to truly empowering women.

A final weakness of this indicator is that it fails to account for regional or ethnic disparities in girls' education.

Recommendation

The Girls' Primary Education Completion Rate indicator performs well on almost all criteria, but it could be adjusted to be better a proxy of a government's commitment to investing in women and reducing gender disparities. Therefore, we recommend the MCC add girls' secondary education enrollment to girls' primary education completion to better measure girls' education.

Post-primary educational opportunities for girls can mean the difference between a safe, healthy, and financially secure life or a cycle of poverty and inequality. However, girls face even more barriers to post-primary education than to primary education.

They are closer to reproductive age and may get married or become pregnant. Also, secondary education is often much more expensive than primary school. A significantly larger “gender gap” exists in secondary school than in primary school.

Including higher levels of education would add a dimension of educational quality to the indicator: “for girls (and boys) to reach secondary education, investments must be made in primary education,” the *UN Millennium Project Task Force on Education and Gender Equality* report says, “thus it is important not to separate primary, secondary, and tertiary education into discrete components but to see them as an integral part in which each component has knock-on effects on the others.”⁵⁰

The UN Development Programme recognizes the importance of girls’ secondary and tertiary education in empowering women, and it compares enrollment ratios for girls to boys in secondary and tertiary education—in addition to primary education—to track progress on the third Millennium Development Goal: “Promote gender equality and empower women.”⁵¹ The UIS requests data for girls’ secondary school enrollment rates annually, but some countries do not submit these data each year. The UIS has girls’ secondary education enrollment data from 2008 or 2009 for 45 MCC 2010 candidate countries. Countries would have a greater incentive to provide these data if they were used for an MCC indicator. We recommend measuring gross enrollment ratios rather than net enrollment ratios because gross enrollment accounts for students above and below the official age of the grade in which they are enrolled. While a measure for girls’ secondary education completion would be ideal, these data are very limited.

In addition to measuring girls’ education, we recommend the MCC add another indicator that better captures a government’s commitment to empowering women. To date, an appropriate indicator does not exist; moreover, an appropriate candidate would probably fit better in the Ruling Justly category than in Investing in People. This issue is explained in further detail in Appendix B: Status of Women Indicator.

Natural Resource Management Indicator: Eco-Region Protection, Access to Improved Water and Sanitation, and Child Mortality

The MCC added the Natural Resource Management indicator in 2006 to assess how well countries manage natural resources. This indicator measures a government’s commitment to improving and maintaining water resources and water systems, proper sewage disposal and sanitary controls, air quality standards, habitat preservation, and biodiversity protection.⁵² The MCC included this indicator because research shows that improving each of these factors promotes long-term sustainable development by enhancing health outcomes, saving time, preserving scarce resources, reducing the number of deaths from disease, and protecting against natural disaster. With strong basic living standards, populations will be able to move

out of subsistence living and pursue more value-added activities that advance a country's economic standing.

Columbia University's Center for International Earth Science Information Network (CIESIN) and the Yale Center for Environmental Law and Policy (YCELP) created the Natural Resource Management indicator. It is a composite of four sub-indicators: (1) Eco-Region Protection, (2) Access to Improved Sanitation, (3) Access to Improved Water, and (4) Child Mortality. A country's Natural Resource Management indicator is calculated by averaging proximity-to-target calculations for respective sub-indicators. If a country is missing data on any sub-indicator, the Natural Resource Management indicator for that country is not calculated. Although CIESIN and YCELP calculate the final number, a number of institutions collect the data on sub-indicators. An analysis of each sub-indicator follows.

Eco-Region Protection

The Eco-Region Protection sub-indicator evaluates whether a country is protecting at least 10 percent of its biomes, preserving the habitat and protecting local biodiversity. In developing it, CIESIN uses the 10 percent target because this value best fits the internationally approved Convention on Biological Diversity.⁵³ The World Wildlife Fund's Terrestrial Eco-Regions Base Global Dataset provides biome data while the UN Environment Program World Conservation Monitoring Centre supplies data from the World Database of Protected Areas.⁵⁴ Data collection and measurement methodologies for this indicator have improved over the years, increasing the accuracy of this indicator. In 2009, CIESIN integrated a higher quality geographic information system software for coastlines, allowing for more accurate spatial assessments of coastline systems. Furthermore, CIESIN adopted a "more streamlined geospatial processing methodology."⁵⁵ CIESIN brings the data together and uses statistical analysis on both datasets to calculate the Eco-Region Protection indicator.

Eco-region protection is important because nature provides a number of goods and services that benefit humans, including food, water, and protection from natural disasters (a list of ecosystem services can be referenced in Appendix C). Additionally, nature offers indirect economic opportunities in the form of ecotourism, bio-prospecting, debt relief through protection and carbon swaps, and conservation investments.⁵⁶ A 1997 study, based on measures of individual willingness-to-pay, estimates the total value for the entire biosphere to be between 16 trillion and 54 trillion U.S. dollars per year.⁵⁷

Protecting eco-regions is in the best interest of society because the "price" of consumption rises as resources grow scarcer. Already, countries are saving and spending billions of dollars to mitigate the effects of climate change and natural degradation.

Strengths

The Eco-Region Protection indicator meets most of MCC's seven criteria, albeit not completely. First, two well-respected universities, Columbia and Yale, developed it. Second, the indicator utilizes rigorous methodology to analyze the best data available. Third, the data collected are publicly available. CIESIN's website allows individuals to download the complete dataset used, while the Terrestrial Eco-Regions Base Global Dataset and the World Database of Protected Areas data can be downloaded from their respective websites. Fourth, these data are collected worldwide using a number of global mapping systems. In 2009, CIESIN collected data for all but two out of 231 countries worldwide.⁵⁸ Fifth, eco-region protection indirectly leads to economic growth and poverty reduction through the economic opportunities nature provides and through subsistence living. Sixth, governments can adopt policies to improve on this indicator, although it is difficult to influence the environment in a two- to three-year time frame.

Although this indicator does not constitute a direct investment in people, it is conceptually valid because it promotes protection of a country's natural environment, which benefits the population in the long run by providing an outlet for income generation and protection from natural disasters. Finally, this indicator performs well in terms of equity: environmental protection is a public good that benefits everybody in a country.

Weaknesses

Although the Eco-Region Protection indicator meets most MCC criteria, it does encounter some problems in its robustness. Both the United Nations and the World Wildlife Fund are highly dependent on geographic information system software, which predicts changes in eco-regions but cannot internalize how changes in environmental conditions affect humans and other species in their habitat. It is not clear how often CIESIN, United Nations, or World Wildlife Fund officials actually travel to eco-regions to collect on-the-ground data and monitor how countries are reporting relevant statistics. YCELP's director states: "Data gaps relate to both the lack of available information on important environmental policy issues and serious shortcomings in the quality, geographical coverage, or timelines of the available data."⁵⁹

Even though Columbia and Yale are premier research institutions capable of using the most analytically rigorous statistical models, collecting comprehensive environmental data is expensive and scientifically demanding. The protocols change constantly, and the data are difficult to measure and monitor (aside from the output from geographic information system software). For the most part, less developed countries struggling to provide basic public services are not independently capable

of collecting on-the-ground scientific data to strengthen the United Nations and the World Wildlife Fund datasets.

Further, although eco-region protection indirectly links to poverty reduction and economic growth, some countries are deficient in productive natural environments and others have unchangeable environmental conditions such as deserts and tundra. Even though protecting the environment to ensure sustainable living conditions and economic activity is beneficial, augmenting some natural conditions to spur economic growth is often impossible and not necessarily sound environmental policy. An emphasis on eco-region protection can create country bias because some nations may be better than others at influencing their local environments.

In addition, some regions may require more than 10 percent protection. CIESIN considers the 10 percent marker as a floor for protecting the environment.⁶⁰ This marker may prompt countries to meet this bottom measure and cease additional improvements even though more protection is desirable. Countries also have different types of biomes, some of which are at higher risk of degradation than others. Failing to acknowledge the uneven distribution of resources by setting a flat 10 percent goal may provide a disincentive for countries to protect high-risk biomes while favoring countries that are not as harmed by environmental changes.

Finally, comparing numbers over time is difficult, an important criterion for this indicator because trends in time-series data show which countries are most effective at maintaining their eco-regions. CIESIN's methodology uses new coastline data and excludes the International Protected Areas measure. This weakens annual measurement consistency because previous analyses used differing coastlines and included protected areas. As technology and measurement methods change, the data may tell a different story in comparison to past studies. Moreover, data on eco-regions are continuously growing, making time series and cross-country comparisons difficult. Some countries may have specific data for a specific time, while others may rarely account for any eco-region measures if they collect data at all. CIESIN suggests this measure will change as environmental scientists come to a greater consensus on suggested levels for protecting the environment, while policymakers may demand stricter targets as the environment changes over time.⁶¹

Recommendation

The Eco-Region Protection variable is not a perfect fit for the Natural Resource Management indicator but is important to include when gauging whether a country should receive a compact because it stresses the significance of maintaining stable environments. Furthermore, the MCC rating would encourage nations to consider their environmental activities and may lead them to protect or improve endangered natural habitats. Conceptually, this measurement is valuable to the Investing in

People category. With stable eco-regions, people can continue living off the land, benefiting from a number of environmental services.

Access to Improved Water and Sanitation

WHO and UNICEF estimated that more than 2.5 billion people did not have access to improved sanitation in 2008,⁶² while approximately 884 million people consume unimproved water.⁶³ Populations without improved sanitation facilities typically practice open defecation or use unimproved sanitation facilities,⁶⁴ creating a risk of contaminating the surrounding area and causing illnesses. When people consume unimproved water, they are more susceptible to a number of water-borne diseases such as cholera, dysentery, and hepatitis. In 2003, an estimated 1.6 million people died from using unsafe water and unimproved sanitation facilities.⁶⁵

Because of the health risks associated with poor sanitation standards and contaminated water, CIESIN incorporated the Access to Improved Sanitation and Access to Improved Water sub-indicators to the Natural Resource Management indicator. CIESIN uses data from the WHO-UNICEF Joint Monitoring Programme for Water Supply and Sanitation. Data are collected through multiple indicator cluster surveys, demographic health surveys, and other supplementary surveys.⁶⁶ Multiple indicator cluster surveys were conducted in 2005 and 2006, and a series of demographic health surveys was carried out in 2005. The next round of multiple indicator cluster surveys began in 2009 and data are now available at the Joint Monitoring Programme for Water Supply and Sanitation website.⁶⁷ National statistics offices and other institutions implement the surveys, and UNICEF and WHO compile the data and make necessary adjustments.⁶⁸

With better water and sanitation, individuals can be more productive as they spend more time working and less time being sick. Lowering the probability of contracting a disease also fosters confidence in survival, encouraging people to invest in more long-term economic development and entrepreneurial activities while reducing expenditures on health care.

Strengths

Water and sanitation indirectly contribute to economic growth and poverty reduction. Including the Access to Improved Sanitation and Access to Improved Water sub-indicators in the Natural Resource Management indicator is conceptually valid, allowing MCC to determine the extent to which countries promote healthy living and improvements to basic sanitary infrastructure. The Access to Improved Sanitation and Access to Improved Water sub-indicators meet most but not all of MCC's criteria for scorecard indicators.

Both of these indicators are evaluated by CIESIN, which receives data from the WHO and UNICEF, well-respected third-party entities. CIESIN applies an analytically rigorous methodology to examine the most comprehensive data available on water and sanitation, which is available on the Joint Monitoring Programme for Water Supply and Sanitation website. The 2008 report has broad country coverage, with data from 84 countries worldwide. In 2009, CIESIN did not have data for only one MCC candidate country's water and sanitation measures.⁶⁹ Although water and sanitation do not directly foster economic growth and poverty reduction, the indirect effects enable a population to improve living standards and pursue greater economic activities. Moreover, policymakers can easily implement programs that work to improve sanitation standards throughout a country, such as extending piped water infrastructure and training communities to development improved human waste facilities.⁷⁰ Additionally, a cost-benefit analysis conducted by Hutton and Haller concludes that for every \$1 invested in sanitation, a country accrues between \$5 and \$28 in benefits.⁷¹ The MCC effect may encourage countries to develop basic living standards that will benefit those without access to clean water and reasonable sanitation facilities.

Finally, access to improved water and sanitation tends to benefit the most vulnerable populations, including women and children. In most countries, urban areas and higher income properties typically have access to improved sanitary facilities. Expanding water and sanitation infrastructure would be directed to rural or low-income areas. The rural elites, the minority of rural populations, would also benefit from this expansion. For this reason, this indicator fits with MCC's desire to benefit vulnerable populations because monitoring institutions can easily verify where and to whom improvements are being made.

Weaknesses

The Access to Improved Sanitation and Access to Improved Water sub-indicators meet most of the MCC's criteria, but do have some weaknesses. First, these indicators face many general problems involved with collecting data, such as missing data across countries and years, plus instances in which data definitions are interpreted differently by surveying agencies, and/or the WHO and UNICEF. Second, water and sanitation improvements measure an input, not an outcome. Water and sanitation do not directly influence economic development and poverty reduction. Rather, their indirect benefits contribute to overall health and productivity. These indirect measures are difficult to quantify because one cannot construct the counterfactual and prove that developing water and sanitation increases gross domestic product. A 2006 UN-HABITAT report stated that at times, some areas need much more than investment in water and sanitation to achieve economic development. UN-HABITAT analyzed two similar cities in

Uganda, one that recently had improved its water and one that had not. This study found no evidence that improved water has stimulated economic growth.⁷²

Finally, some countries have more clean water. This creates an unfair bias against countries that are water deficient. It cannot be expected that a country such as Algeria, which is in the Sahara desert, can provide an equal amount of improved water resources the way Vietnam, which receives ample rainfall, can. Further exacerbating the situation is the fact that poor countries deficient in fresh water must pay a premium to import water for sanitation and agriculture. With limited resources, improved water and sanitation systems may be less important than supporting basic agriculture.

Recommendation

Although water and sanitation do not directly affect economic development and poverty reduction, the Access to Improved Water and Sanitation Indicators are good proxies for a government's commitment to investing in people, especially vulnerable and rural populations, and investments in improved water and sanitation have high returns in terms of improved public health. Measuring every country and monitoring surveying agencies will strengthen the datasets and improve cross-country comparisons, but there are sufficient data available for MCC to gauge whether a country is investing in its people.

Child Mortality

Child Mortality is the fourth sub-indicator that composes the Natural Resource Management indicator. Empirical research shows that reductions in child mortality rates coincide with economic growth. As families become more confident that their children will live past the age of 5 years, they are more likely to make human capital investments in them. Families witness a higher rate of return on education where children can pursue more value-added activities in the future.⁷³ These investments in human capital, the prime engine for economic growth,⁷⁴ overlap with the ongoing declines in child mortality rates, shrinking number of people living under the \$1.25 poverty measure, and lowering fertility rates.⁷⁵

In 2008, UNICEF estimated that 8.8 million children died before their fifth birthday, compared to 12.5 million in 1990.⁷⁶ The 2008 figure is still very high, but indicates that countries are making progress on reducing child mortality. These statistics show that policies can have a significant effect on child mortality rates in a relatively short period of time. A 2008 UNICEF report states that on average, 1 million children could be saved yearly for \$1 billion through the use of child and maternal immunizations, another MCC indicator.⁷⁷ Furthermore, a majority of child deaths are caused by adverse environmental conditions⁷⁸ such as malaria-infested mosquitoes, contaminated water, and malnutrition from improper feeding methods.⁷⁹ Initiatives

such as distributing mosquito nets, improving basic water and sanitation, and teaching proper child-care methods could reduce child mortality and promote economic development and poverty reduction.

The UN Population Division provides the data the MCC uses in the Child Mortality indicator. The data are drawn from administrative records, population and housing censuses, and the multiple indicator cluster and demographic health surveys to estimate child mortality numbers. The UN Population Division is re-estimating historical demographic trends since 1950 for all countries to supply more accurate data and allow for better cross-country and time series comparisons.⁸⁰

Strengths

The Child Mortality indicator mostly conforms to MCC's criteria for using a measurement. Data are collected by the UN Population Division and evaluated by CIESIN. Both organizations use analytically rigorous methodology and the best data available to come up with their numbers. The United Nations gathers information from a majority of countries, allowing for cross-country comparisons: 36 out of 231 countries did not report child mortality statistics, and all but one MCC candidate country reported on this measure in 2009.⁸¹ Data are available on the UN Statistics Division website.⁸² UNICEF states that many policies are available to reduce the child mortality rate. Finally, UN Population Division's re-estimation of population demographics will improve consistency in the data from year to year. Additionally, the Child Mortality indicator holds concept validity because it is a basic output measure for all investments in people. To improve on this indicator, a government could enact countrywide policies to help people facing high child death rates, typically impoverished populations.

Weaknesses

While the child mortality indicator meets most of the MCC criteria, it faces similar data problems as the other indicators. In the World Population Prospects Report: 2008 Revision, the United Nations admits that for 30 percent of countries demographic data is so deficient or inconsistent it could not re-estimate child mortality rates.⁸³ In addition, although child mortality specifically targets one of society's most vulnerable groups, it may mask inequities in child mortality rates between urban and rural populations, genders, ethnicities, and other groups, and thus this sub-indicator fails to meet our equity criterion.

The biggest problem with incorporating child mortality into the Investing in People category is that this indicator strongly correlates with other measures such as immunization rates, government expenditure on health care, eco-region protection, and access to improved water and sanitation. Research shows that improvements in each of the aforementioned variables reduces the child mortality rate. As the child

mortality indicator is somewhat dependent on these other variables, keeping this indicator secondary to the Natural Resource Management indicator may lead to double counting, which creates a bias for countries that improved in areas other than natural resource management.

Recommendation

A number of institutions use child mortality rates to gauge countries' levels of development. Although a useful statistic, this indicator is heavily correlated with other Investing in People indicators and using it favors countries that already improved on other variables. Improving water, sanitation, and infrastructure; providing health care and immunizations; and educating the population all lower child mortality rates. For this reason, child mortality rates should be removed as a component of the Natural Resource Management indicator and be upgraded to a primary Investing in People indicator because it represents an output measure for improvements in all Investing in People indicators. Child mortality measures the aggregate effect of a number of national initiatives, giving a reasonable depiction of how governments provide for their people. The importance of having a comprehensive output measure for many indicators outweighs any instance of double counting.

Recommendation of New Indicators

Analyzing the existing indicators provided useful information about what gaps could be filled by adding new indicators. The existing MCC indicators do not comprehensively capture all aspects of Investing in People. We recommend the MCC add two indicators, Body Mass Index and Investment in Infrastructure, to strengthen the Investing in People category. These two indicators are well developed, meet the MCC's criteria and our criteria, and will complement the existing indicators by providing broader insight into a government's commitment to investing in people. We also suggest two indicators for the MCC to consider as additions to the Investing in People category: Occupational Training and Non-Formal Education, and Presence and Makeup of Social Safety Nets. These indicators would provide valuable insight into a government's commitment to investing in people, but to date they are not sufficiently developed for the MCC's purposes.

Body Mass Index

The WHO and the Food and Agricultural Organization are developing this indicator. Body Mass Index is a rudimentary measure of weight and height proportions, and extreme points indicate if an individual is overweight or underweight. Although Body Mass Index does not indicate the quality of nutrition, Body Mass Index trends will indicate if a population has adequate nutrition. Because Body Mass Index is unique from other MCC indicators in that a higher Body Mass Index average is not necessarily associated with good health, the MCC should utilize the percentage of the population in the ideal Body Mass Index range (as defined by the WHO) for this measure.

To compensate for the poor equity performance of several of the other Investing in People indicators, the MCC may choose to examine the Body Mass Index trends of children or women to serve as a proxy for state-funded nutritional programs for children or for gender equality. Alternatively, MCC may elect to consider all Body Mass Index trends in a country to see how the overall nutritional needs of the population are met.

With this indicator, the WHO provides basic descriptive Body Mass Index data, including mean, standard deviation, and prevalence rates by gender, age, and location. The WHO uses international Body Mass Index standards to determine which populations or subsections are in danger of malnutrition or obesity. These standards translate across countries and do not have consistency errors of variables measured in country currency. Unlike expenditure variables, Body Mass Index is measured according to a simple, internationally recognized method. The data can also be made publically available as soon as they are collected. The data have broad country coverage and are likely to be broadly consistent across time.

This indicator meets five of the MCC's indicator criteria. An independent third party develops the Body Mass Index database. Additionally, the data are high quality. Population data standards require that data be collected from a sufficiently large and appropriately representative cross section. Data are collected from, at minimum, 100 citizens and only require instruments to measure height and weight. Because the data are collected by investigators and not health ministries, there are no incentives to cheat. The only threat to the quality of data is the sophistication of sampling and weighting techniques and instances of human error.

Only minimal inequities are associated with this indicator. Body Mass Index is simple to measure, accessible, and the data are uninfluenced by government interference. Depending on how the WHO chooses to collect the data, the data may or may not reflect regional, ethnic, or gender disparities.

The Body Mass Index meets the concept validity of investing in people as well. It serves as an excellent proxy for the quality of life of subsistence farmers in rural communities and the availability of food in urban communities. It is a proxy for government initiatives to improve agriculture, food supply, and the nutrition of at-risk populations, such as children. Nutritional quality relates directly to health. Malnutrition exacerbates disease and causes deficiencies that may lead to specific diseases.⁸⁴ Therefore, proper nutrition is an essential building block for a healthy population.

The Body Mass Index may better serve as a proxy for investment in people in some countries than in others. Fighting malnutrition may not be a top policy priority in all MCC beneficiary countries.⁸⁵ Ideally, the MCC's method of scoring countries within the same income range will take account of these differences.

Investment in Infrastructure: Roads and Nighttime Lights

Physical infrastructure is critical to stimulating economic development. Examples such as the U.S. New Deal in the 1930s, China's current stimulus package, and the reconstruction of Japan after World War II all indicate that infrastructure development leads to economic growth. Investment in infrastructure by sovereign nations, regional development banks, and multinational corporations leads to improvements in basic living standards, in-country efficiency, necessary inputs to production, and better access to international markets. Moreover, shocks to infrastructure can lead to permanent changes in per-capita income.⁸⁶

Just as important, however, is that infrastructure provides a foundation allowing society to function and grow. Without adequate roads, people cannot travel safely to hospitals or schools. Without adequate lighting, hospitals and schools cannot function at their full capacity. Essentially, infrastructure is the most basic form

of an Investing in People indicator—without it, immunizations cannot be distributed, education cannot be provided, and natural resources cannot be protected at the national scale.

Moreover, private companies will be more inclined to invest in a country if a government fosters a stable society and sufficient levels of infrastructure. As a side effect, private entities may invest in additional infrastructure while creating jobs. By adding an infrastructure indicator, MCC can gauge how well a country invests in people because infrastructure provides a basis for opportunities.

An investment-in-infrastructure indicator would conform to all seven MCC criteria and be linked to economic growth. Additionally, an investment in infrastructure indicator conforms to our two criteria: equity and concept validity. Moreover, this indicator would outperform all other indicators in terms of data related criteria. However, not all data on infrastructure can be used. For example, gross domestic product expenditure on various types of infrastructure may be unreliable and easily manipulated. Satellite images, however, provide a useful output measurement of actual government investment in infrastructure. For this reason, roads and nighttime lights provide an unalterable consistent dataset that MCC can reliably use as sub-indicators to measure infrastructure as a form of government investment in people. Although roads and nighttime lights do not cover all areas of infrastructure development, they are basic indicators for development and economic expansion.

Infrastructure development, including roads and power generation, is policy-linked. Building roads and expanding nighttime lights requires governmental action that can be implemented and completed within two to three years. Again, the quality of the data and potential policy linkages outperform the existing Investing in People indicators.

A drawback to a roads and nighttime lights indicator is that it is prone to income and cross-country biases. First, countries with higher incomes for reasons beyond their control—for example, a strategic trade location or abundance of natural resources—will be more likely to have more roads and nighttime lights. Additionally, some countries may receive infrastructure assistance from regional development banks, other nations, or businesses searching to exploit local resources. Outside help would artificially raise a country's score on the investment in infrastructure indicator, creating an unfair advantage in comparison to countries that do not receive any outside assistance. Although outside assistance would create an unlevel playing field for this indicator, it does increase a nation's potential to grow.

Roads

Roads have been providing the basic infrastructure for individuals, communities, and nations to develop for thousands of years. Roads allow governments and other institutions to deliver assistance, enable people to access services and move from one place to the other to visit friends and family, pursue economic activities, and travel for leisure. Expanding and maintaining road networks increase a country's overall efficiency, granting access to remote locations or reducing congestion. With a solid road network, a country can utilize its natural resources and human capital to engage in poverty reduction and sustainable economic activities.

The International Road Federation, which has been collecting road and vehicle statistics since 1963, compiles data from official sources from national statistics offices and road administrations in 185 countries, while Eurostat, Afristat, the World Bank, African Development Bank, and the UN Economic Commission for Europe provide supplementary information.⁸⁷ Moreover, maps and global positioning systems detail road networks worldwide. With this vast amount of reliable data, MCC can use roads as a proxy for governments' commitment to providing the most basic transportation infrastructure. The one drawback to this dataset is that organizations or individuals must pay for the service, although other, less comprehensive datasets are publicly available from other institutions.

The main weakness of this sub-indicator is that roads are not directly linked with economic growth. Rather, they simply provide the basic means for populations to move about freely for any number of reasons. Although roads do not generate money, they do provide means to make it. For this reason, MCC should use this infrastructure sub-indicator to gauge how well a country can grow economically.

Nighttime Lights

Since the 1970s, the U.S. Air Force Defense Meteorological Satellite Program has operated satellite sensors—referred to as the Operational Linescan System—that detect nighttime light emissions from cities and towns.⁸⁸ While these data have been primarily used as a means of measuring carbon dioxide emissions and for infrastructure assessments, recent research examines the relationship between access to lights and poverty status. Electricity, supplied by governments in many countries, generates light usage, and studying nighttime light usage speaks to more than just access to electricity. A 2009 study theorized that nighttime light data, when combined with international census population density measures, help to identify the poorest sectors of the population.⁸⁹ Specifically, they state “nighttime lights provide a useful proxy for ... annual growth rates for development.”⁹⁰

Using Nighttime Lights has its advantages. The data meet the MCC's criteria of collection by a third party with rigorous analytical collection methods. The Defense Meteorological Satellite Program regularly and reliably collects and measures data

that are independent of candidate country input, are publicly available, and measure outputs (access to lights) instead of inputs. More importantly, the long-term collection of the data, combined with the fact that it is independent from the candidate countries themselves, make it one of the strongest data sources we have examined: “Satellite sensors provide one of the few globally consistent and repeatable sources of observations.”⁹¹

This sub-indicator also has weaknesses. A 2007 study identified the need for improvement of the Defense Meteorological Satellite Program. In particular, improving detection methods of low-light would provide greater insight into home light usage and daytime light usage.⁹² Improved information in both of these areas would necessarily strengthen opportunities to further research light usage and its relation to development. Research is only available linking this measurement to electricity usage. However, improved imagery would enhance insight as to the extent to which people have access to this aspect of public infrastructure. Finally, it assumes the government supplies the majority of the electricity to a country—and does not take into account private generation. We assume this to have limited effect: countries without enough infrastructure to provide public electric generation would likely be screened out as candidates for MCC funding for other reasons (corruption, instability, lack of political freedom, etc.).

While weaknesses exist in directly linking nighttime light usage to development, Defense Meteorological Satellite Program data meet many of the MCC criteria that existing indicators do not. Specifically, the data are regularly collected by an independent third source and offer insight into country demographics that cannot be manipulated. These facts should not be ignored, considering that research thus far suggests that electricity usage might be related to poverty rates.

Due to the importance of infrastructure on economic development and poverty relief, the availability of high-quality data, and policy linkages, we recommend that the MCC include an infrastructure indicator broken down into two sub-groups: roads and nighttime lights.

Potential Indicators

We suggest the MCC consider adding two primary indicators once data can be collected in a manner meeting MCC standards. These two indicators are Occupational Training and Non-Formal Education, and the Presence and Makeup of Social Safety Nets.

Occupational Training and Non-Formal Education

Investing in human capital contributes to populations' ability to grow economically, allowing individuals and companies to open new businesses and improve efficiency. Higher learning and diverse skills support employability and allow individuals to pursue more valued-added activities outside of typical low-skilled jobs. Furthermore, a trained workforce attracts foreign direct investment, which brings in new technologies and further improves human resources and standards of living.⁹³ Aside from formal schooling, occupational training and non-formal education help develop human capital. Both initiatives target specific skills sets that help individuals left out of the formal education sector develop competencies that economies require. Although improving human capital through individual skill development does not generate jobs, it creates opportunities for employment in new industries while improving job retention rates.⁹⁴ Hugo Ghione from the International Labor Organization confirms this: "Education and training are a means to empower people, improve the quality and organization of work, enhance citizens' productivity, raise workers' incomes, improve enterprise competitiveness, and promote job security and social equity and inclusion. Education and training are therefore a central pillar of decent work."⁹⁵

Due to these benefits, MCC may want to consider occupational training and non-formal education as a future indicator. At present, no reliable database collects and monitors participation in occupation trainings and non-formal education. However, the International Labor Organization conducted a pilot study in 2002 on the availability of these statistics. Of countries given surveys in Asia, the Pacific, and Africa, only half provided the information requested.⁹⁶ Although much of the information did not appear to be accessible, the International Labor Organization stated it could be accessed upon request. Because statistics provide valuable insights into the best practices of development, MCC should foster the creation of a training database to see which countries are investing in the population and how well they perform.

Presence and Makeup of Social Safety Nets

Evidence shows that social safety nets in developing countries help mitigate hunger, increase incomes, improve educational and health outcomes, promote gender equity, empower the poor, and contribute to economic growth and

development.⁹⁷ Although many argue that social safety nets are too expensive for less developed countries, research shows that even poor countries can implement marginal transfers that support the population and stimulate growth. Today, all countries have some form of social transfer system, funded locally or through development assistance.⁹⁸ A 2008 World Bank study on social safety nets from 87 countries found that mean spending on social transfers is 1.9 percent of gross domestic product in less developed countries and 2 to 4 percent in developed nations.⁹⁹

Due to the ubiquitous nature of social safety nets, MCC can consider their presence as a potential indicator for the Investing in People category. They meet a number of MCC's goals, such as promoting equity and fostering economic growth. Furthermore, social transfer systems reflect a government's commitment to servicing even the poorest constituency. The caveat of using this indicator is that there is only one comprehensive study that accumulated data on the topic over a 10-year time period. Additionally, data on sub-Saharan Africa are sparse; the method of measurement is not standardized; and many individuals completed the survey. In addition, governments may direct funds to initiatives that do not actually benefit the most vulnerable people.¹⁰⁰ Subsidies or cash transfers can hinder economic efficiency and may be manipulated to benefit people who do not need governmental assistance.

Despite these data issues, MCC can consider this indicator in the future if the World Bank continues to track social safety net data and countries begin to report social transfer spending more frequently. Social safety nets ensure that people have a minimal standard of living, providing an opportunity to seek additional economic growth.

Conclusion and Recommendations

In the analysis presented in this report, we assembled an “ideal basket” of indicators for the MCC’s Investing in People category. We evaluated the five indicators Investing in People comprises according to the seven criteria by which the MCC determines indicator quality. We developed two additional criteria to capture how well an indicator serves as a proxy for a government’s commitment to investing in people. We also identified and evaluated four additional indicators that represent other policy issues related to investing in people and that, as such, would strengthen Investing in People.

While existing indicators all had substantial problems common to data on developing countries, we determined the data for each of MCC’s five indicators are the best available. We do not recommend any changes due to data quality concerns. We found the Immunization Rate indicator and the Natural Resource Management indicator’s Access to Improved Water, Access to Improved Sanitation, and Eco-Region Protection sub-indicators perform well overall. We recommend the MCC maintain these indicators in their current form.

The Public Expenditure on Health indicator is valuable in measuring direct government investment in health but fails to account for improved health outcomes. For this reason we recommend the MCC keep it but also review health output indicators such as the Child Mortality indicator, Body Mass Index, or supplemental information.

The remaining MCC indicators provide valuable contributions to the Investing in People category but should be improved to better reflect concept validity. We recommend changing the Public Expenditure on Primary Education indicator to a combined indicator that includes public expenditures on education and educational quality-related indicators such as grade repetition rates or percentage of trained teachers. This would provide a more robust measure of investment in primary education. To better capture a government’s commitment to empowering women and girls, we recommend adding a girls’ secondary education enrollment rate measure to the Girls’ Primary Education Completion Rate indicator. Because a number of poverty-related issues influence child mortality rates, we recommend removing Child Mortality from the Natural Resource Management indicator and making it a primary Investing in People indicator.

Of the indicators we evaluated as potential Investing in People candidates, Body Mass Index and Investment in Infrastructure (comprising Roads and Nighttime Lights) performed well in terms of data quality and their abilities to serve as proxies for a government’s commitment to investing in people. Body Mass Index data are easily obtained, serve as a proxies for availability of food, and can be used to address certain equity issues. As sub-indicators for Investment in Infrastructure, Roads and Nighttime Lights serve as proxies for improvements in basic living standards and access to health care, education, markets, and other vital resources. We recommend the MCC adopt these indicators. The remaining indicators—Occupational Training and Non-Formal Education, and Presence and Makeup of Social Safety Nets—require further data development, but they may be good candidates in the future when better datasets become available. We also recommend the MCC adopt an additional indicator to measure a government’s commitment to women’s empowerment, but this indicator would be better placed in the Ruling Justly category, not in Investing in People.

In sum, our recommended basket consists of the following indicators of government commitment to investment in people:

1. Immunization Rates
2. Public Expenditure on Health, supplemented by output indicators and other information when possible
3. Body Mass Index
4. Child Mortality
5. Investment in Education
 - a. Public Expenditure on Primary Education
 - i. Educational Quality Indicator(s): e.g., grade repetition rates, percentage of trained teachers, etc.
 - b. Girls’ Education
 - i. Girls’ Primary Education Completion Rate
 - ii. Girls’ Secondary Education Enrollment
6. Natural Resource Management
 - a. Eco-Region Protection
 - b. Access to Improved Water
 - c. Access to Improved Sanitation
7. Investment in Infrastructure
 - a. Public Expenditure on Roads
 - b. Nighttime Lights

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Appendix A: International Standard Classification of Education (ISCED)¹⁰¹

70912 Primary Education (IS) (ISCED-097):

- Provision of primary education at ISCED-97 level 1;
- administration, inspection, operation or support of schools and other institutions providing primary education at ISCED-97 level 1.

Includes: literacy programs for students too old for primary school.

Excludes: subsidiary services to education (70960).

LEVEL 1—PRIMARY EDUCATION OR FIRST STAGE OF BASIC EDUCATION

Principal characteristics

45. Programmes at level 1 are normally designed on a unit or project basis to give students a sound basic education in reading, writing and mathematics along with an elementary understanding of other subjects such as history, geography, natural science, social science, art and music. In some cases religious instruction is featured.

46. The core at this level consists of education provided for children, the customary or legal age of entrance being not younger than five years or older than seven years. This level covers in principle six years of full-time schooling.

47. Throughout this level the programmes are organized in units or projects rather than by subjects. This is a principal characteristic differentiating programmes at this level in most countries from those at level 2.

Classification criteria

48. For the definition of the boundary between education levels 0 and 1 (pre-primary and primary education) the following criteria are relevant:

Main criterion: the beginning of systematic studies characteristic of primary education, e.g., reading, writing and mathematics.

Subsidiary criteria: entry into the nationally designated primary institutions or programmes; and the start of compulsory education where it exists.

Includes also:

49. In countries where primary education is part of 'basic education', only the first stage should be included in level 1. If 'basic education' is not officially divided into stages, only the first six years should be classified as level 1.

50. This level category also includes programmes suited to children with special needs education.

51. Literacy programmes within or outside the school system which are similar in content to programmes in primary education for those considered too old to enter elementary schools are also included at this level because they require no previous formal education.

Appendix B: Status of Women Indicator

A country cannot develop to its full potential if half of its population, i.e., its women, are marginalized. Women's empowerment—including access to education, economic and political opportunities—is a critical component of economic development. An additional indicator measuring a government's commitment to women's economic and political participation would complement the girls' education indicator and strengthen the MCC's selection criteria. Share of women in wage employment in non-agricultural sector, proportion of seats held by women in national parliament, and women's rights are all potential indicators; however, the former two indicators perform poorly on the policy-linked criterion. An indicator measuring women's rights would best meet the MCC's needs, but it belongs in the Ruling Justly category rather than the Investing in People category. Freedom House collects data on women's rights, but only for the Middle East and North Africa.¹⁰² If further developed, the MCC should consider adopting this indicator as part of the Ruling Justly category.

Need for a Status of Women Indicator

An additional indicator focused on women's status in society would strengthen the MCC's ability to capture a government's commitment to women's empowerment. According to the UN Millennium Project, “important as it is for women's well-being and the development of societies, education alone is insufficient to eliminate the wide range of gender inequalities found in many societies. Education may be an important precondition to women's empowerment, but it does not guarantee that empowerment. For this to occur, women must also enjoy equal rights with men, equal economic opportunities, use of productive assets, freedom from drudgery, equal representation in decisionmaking bodies, and freedom from the threat of violence and coercion.”¹⁰³ A government may appear committed to women's empowerment based on its investment in girls' primary education, but it may still have discriminatory laws that impede women from engaging in economic or political activities and ultimately having control over their own lives.

Findings

The Millennium Development Project measures progress on the third Millennium Development Goal: “Promote gender equality and empower women” with three indicators: ratios of girls to boys in primary, secondary and tertiary education; share of women in wage employment in the non-agricultural sector; and proportion of seats held by women in national parliament.¹⁰⁴ In our report, we recommend expanding the girl's primary education completion rate indicator to include enrollment in secondary education. A separate indicator for female education is important because it provides some sort of an educational output measure to complement the primary education expenditures measure, which looks at input, and

because girls' education is a necessary precursor to women's empowerment. Share of women in wage employment in the non-agricultural sector is a good proxy for women's status in society but is not easily influenced by government policies; furthermore few data exist for this indicator.

The proportion of seats held by women in national parliament also serves as a proxy for status of women and is particularly useful because it is easy to measure; however, it is difficult for governments to influence in two to three years. Quotas are the most direct approach governments have used to increase the number of women in parliament, but they are controversial in terms of the legitimacy and actual political power of women elected through them, and because they undermine the idea of democracy.

An indicator measuring women's rights would be a better fit for the MCC because it would have stronger policy linkages and a more direct relationship to status of women. Because stronger women's rights increase the ability of women to contribute to their countries' economies, in theory, women's rights have an indirect link to economic growth. Freedom House has developed an index measuring women's rights in North Africa and the Middle East in 2004 and 2009, but a women's rights indicator with comprehensive coverage across countries and years does not yet exist.¹⁰⁵ Additionally, a women's rights indicator does not capture the Investing in People category's goal of measuring a government's commitment to financial investment in people and would better fit in the Ruling Justly category.

Recommendation

None of the three indicators discussed above perform well enough for the MCC to adopt as a proxy for women's status. The women's rights indicator has the greatest potential; if adequately developed, the MCC should consider adopting it as part of the Ruling Justly category.

Appendix C: Natural Capital and Ecosystem Services

Ecosystem service	Ecosystem functions	Examples
Gas regulation	Regulation of atmospheric chemical composition	CO ₂ /O ₂ balance, O ₃ for UVB protection, and SO _x levels
Climate regulation	Regulation of global temperature, precipitation, and other biologically mediated climatic processes at global or local levels	Greenhouse gas regulation, DMS production affecting cloud formation
Disturbance regulation	Capacitance, damping, and integrity of ecosystem response to environmental fluctuations	Storm protection, flood control, drought recovery, and other aspects of habitat response to environmental variability mainly controlled by vegetation structure
Water regulation	Regulation of hydrological flows	Provisioning of water for agricultural (such as irrigation) or industrial (such as milling) processes or transportation
Water supply	Storage and retention of water	Provisioning of water by watersheds, reservoirs and aquifers
Erosion control and sediment retention	Retention of soil within an ecosystem	Prevention of loss of soil by wind, runoff, or other removal processes, storage of silt in lakes and wetlands
Soil formation	Soil formation processes	Weathering of rock and the accumulation of organic material
Nutrient cycling	Storage, internal cycling, processing and acquisition of nutrients	Nitrogen fixation, N, P and other elemental or nutrient cycles
Waste treatment	Recovery of mobile nutrients and removal or breakdown of excess or xenic nutrients and compounds	Waste treatment, pollution control, detoxification
Pollination	Movement of floral gametes	Provisioning of pollinators for the reproduction of plant populations
Biological control	Trophic-dynamic regulations of populations	Keystone predator control of prey species, reduction of herbivory by top predators
Refugia	Habitat for resident and transient populations	Nurseries, habitat for migratory species, regional habitats for locally harvested species, or overwintering grounds
Food production	Portion of gross primary production extractable as food	Production of fish, game, crops, nuts, fruits by hunting, gathering, subsistence farming or fishing
Raw materials	Portion of gross primary production extractable as raw materials	Production of lumber, fuel or fodder
Genetic resources	Sources of unique biological materials and products	Medicine, products for materials science, genes for resistance to plant pathogens and crop pests, ornamental species (pets and horticultural varieties of plants)
Recreation	Providing opportunities for recreational activities	Eco-tourism, sport fishing, other outdoor recreational activities
Cultural	Providing opportunities for non-commercial uses	Aesthetic, artistic, educational, spiritual, and/or scientific values of ecosystems

Source: Constanza, Robert, et al.

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