

GAO

Report to the Chairman, Committee on
Foreign Affairs, House of
Representatives

July 2007

MILLENNIUM
CHALLENGE
CORPORATION

Vanuatu Compact
Overstates Projected
Program Impact





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Highlights of [GAO-07-909](#), a report to the Chairman, Committee on Foreign Affairs, House of Representatives

Why GAO Did This Study

In January 2004, Congress established the Millennium Challenge Corporation (MCC) for foreign assistance. Congress has appropriated almost \$6 billion to MCC. As of March 2007, MCC had signed almost \$3 billion in compacts with 11 countries, including a 5-year, \$65.7 million compact with Vanuatu. MCC states that the Vanuatu compact will have a transformational effect on the country's economy, increasing per capita income and GDP and benefiting 65,000 poor, rural people. GAO examined (1) MCC's methods of projecting economic benefits, (2) MCC's portrayal and analysis of the projected benefits, and (3) risks that may affect the compact's impact. GAO reviewed MCC's analyses and met with officials and business owners in Vanuatu as well as with other donors.

What GAO Recommends

GAO recommends that the Chief Executive Officer of MCC (1) revise the public reporting of the Vanuatu compact's projected impact, (2) assess whether similar reporting in other compacts accurately reflects underlying analyses, and (3) improve its economic analyses by more fully accounting for risks to project benefits. MCC did not directly address our recommendations but commented that it had not intended to make misleading statements and that its portrayal of projected results was factual and consistent with underlying data.

www.gao.gov/cgi-bin/getrpt?GAO-07-909.

To view the full product, including the scope and methodology, click on the link above. For more information, contact David Gootnick, (202) 512-3149, gootnickd@gao.gov.

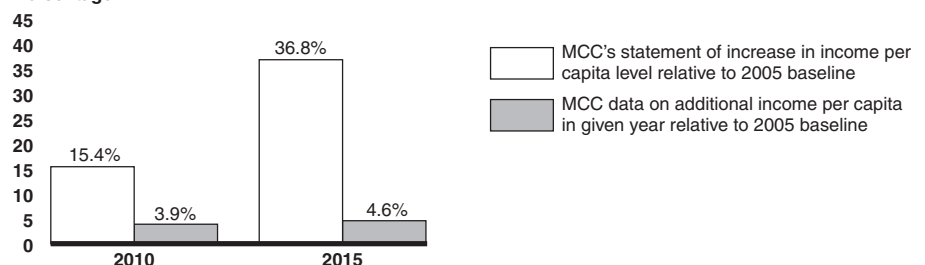
What GAO Found

MCC projects that the Vanuatu compact's transportation infrastructure projects will provide direct benefits such as reduced transportation costs and induced benefits from growth in tourism and agriculture. MCC estimated the costs and benefits over 20 years, with benefits beginning in full in 2008 or 2009 and growing each year, and it counted poor, rural beneficiaries by defining the area where benefits were likely to accrue. Using projected benefits and costs, MCC calculated the compact's economic rate of return (ERR) and its effects on Vanuatu's gross domestic product (GDP) and per capita income.

MCC's portrayal of the projected impact does not reflect its underlying data. MCC states that per capita income will increase by approximately \$200, or 15 percent, by 2010 and by \$488, or 37 percent, by 2015. However, MCC's underlying data show that these figures represent the sum of individual years' gains in per capita income relative to 2005 and that actual gains will be \$51, or 3.9 percent, in 2010 and \$61, or 4.6 percent, in 2015. MCC also states that GDP will increase by an additional 3 percent a year, but its data show that after GDP growth of 6 percent in 2007, the economy's growth will continue at about 3 percent, as it would without the compact. MCC states that the compact will benefit approximately 65,000 poor, rural inhabitants, but this statement does not identify the financial benefits that accrue to the rural poor or reflect its own analysis that 57 percent of benefits go to others.

We identified five key risks that could affect the compact's projected impacts. (1) Cost estimate contingencies may not be sufficient to cover project overruns. (2) Compact benefits will likely accrue more slowly than MCC projected. (3) Benefit estimates assume continued maintenance, but MCC's ability to ensure maintenance will end in 2011, and Vanuatu's maintenance record is poor. (4) Induced benefits depend on businesses' and residents' response to new opportunities. (5) Efficiency gains, such as time saved in transit, may not increase per capita income. Our analysis of these areas of risk illustrates the extent that MCC's projections are dependent on assumptions of immediate realization of benefits, long-term maintenance, realization of induced benefits, and benefits from efficiency gains.

Vanuatu Compact's Impact on Per Capita Income According to MCC Statement vs. MCC Data Percentage



Source: GAO analysis of MCC data.

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Abbreviations

ADB	Asian Development Bank
CEO	Chief Executive Officer
ERR	economic rate of return
GDP	gross domestic product
IMF	International Monetary Fund
MCA	Millennium Challenge Account
MCC	Millennium Challenge Corporation
PWD	Public Works Department

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United States Government Accountability Office
Washington, DC 20548

July 11, 2007

The Honorable Tom Lantos
Chairman
Committee on Foreign Affairs
House of Representatives

Dear Mr. Lantos:

In January 2004, Congress established the Millennium Challenge Corporation (MCC) to administer the Millennium Challenge Account (MCA) for foreign assistance. MCC's mission is to reduce poverty by supporting sustainable, transformative economic growth in developing countries that create and maintain sound policy environments. MCC carries out this mission by funding projects or activities in developing countries that have demonstrated a commitment to ruling justly and democratically, encouraging economic freedom, and investing in people. Congress appropriated almost \$6 billion for fiscal years 2004 to 2007 to MCC, and the President has requested an additional \$3 billion in MCC funding for fiscal year 2008.

As of March 2007, MCC had signed compacts with 11 countries, totaling approximately \$3 billion, including a 5-year, \$65.7 million compact with the Pacific island nation of Vanuatu.¹ Although MCC's compact with Vanuatu is its smallest compact monetarily, it provides by far the largest amount relative to the country's population and gross domestic product (GDP).² In a process known as due diligence, MCC analyzed Vanuatu's proposal for compact assistance to determine the compact's expected economic rate of return (ERR)³ and impact on poverty reduction and

¹An MCC compact is an agreement between the U.S. government, acting through MCC, and the government of a country eligible for MCA assistance.

²MCC's \$65.7 million compact with Vanuatu provides \$317 per capita; in contrast, MCC's \$547 million compact with Ghana—its largest compact—provides \$25 per capita. The amounts provided per capita by the 11 compacts signed to date range from \$6 for Madagascar to \$317 for Vanuatu.

³Project cash flows are determined by comparing program spending against future expected increases in value added or income. The internal rate of return is calculated for these cash flows to summarize the economic impact. MCC refers to this internal rate of return as the economic rate of return.

economic growth. After completing its due diligence analysis, MCC stated in its compact and in its notification to Congress that it expects the Vanuatu compact to have a transformational impact on Vanuatu's economic development—an effect MCC defines as “a dramatic and long-lasting impact on poverty reduction through sustainable economic growth.”⁴ MCC states that its compacts will provide or contribute to a transformational impact in 5 of its 11 compacts.⁵

At your request, we reviewed MCC's economic analyses of the Vanuatu compact. Specifically, we examined

- MCC's methods of projecting the compact's economic benefits and methods of calculating the benefits,
- MCC's portrayal and analysis of the projected benefits, and
- risks that could affect the compact's impact on poverty reduction and economic growth.

We reviewed MCC's record of due diligence and supplemented this review with interviews with MCC officials to identify MCC's logic, data, methods, and assumptions for determining the compact's projected costs and benefits, and to identify the projected effects on GDP, per capita income, and poverty. We evaluated MCC's statements about the compact's impacts in its notification to Congress, in the Vanuatu compact, and in its “investment memo”⁶ by comparing these statements with the underlying analyses and data used to support them. We could not validate most of

⁴Millennium Challenge Account, *Best Practices in Compact Development* (Washington, D.C.: 2006).

⁵For example, in Nicaragua, MCC expects that the compact will transform project areas into an engine of economic growth; in El Salvador, MCC states that the compact provides an historic opportunity to transform the country's economic development; and in Armenia, MCC is undertaking road and irrigation projects to transform the economic performance of Armenia's agricultural sector.

⁶The “investment memo” is an MCC internal document prepared by MCC's compact assessment team and submitted to MCC's investment committee—consisting of MCC's Chief Executive Officer (CEO), vice presidents, and other senior officials. The committee reviews the memo and decides whether to recommend proceeding to compact negotiations.

MCC's underlying data and assumptions because the data were not available or could not be checked within the time frames of our engagement. We examined MCC's methodologies and checked the analyses for calculation errors. Further, we identified risks to MCC's compact results based on our review of MCC's internal documentation, donor reporting, and academic development literature. We interviewed Vanuatu and MCC officials and contacted the contractor that assisted in MCC's analyses. We also interviewed interested parties such as tourism and agriculture business owners in Vanuatu. We focused our analysis and field work on MCC's three transportation infrastructure projects on Vanuatu's two most populous islands, Santo and Efate, which represent 56 percent of compact cost. We modeled several areas of project risks to illustrate their maximum impact on the economic analyses of ERR, GDP, and per capita income. In modeling these risks, we used the data from MCC's economic analyses; we did not validate these data. We conducted our review from August 2006 through May 2007 in accordance with generally accepted government auditing standards.

Results in Brief

MCC projected the impact of the Vanuatu compact by estimating the program's benefits, costs, and beneficiaries and calculating the compact's effect on per capita income, GDP, and poverty reduction. According to MCC, transportation infrastructure improvements will provide direct benefits from construction spending in the local economy, reduced transportation costs, and improved services. The improved infrastructure will also provide induced benefits from growth in Vanuatu's tourism and agriculture sectors. MCC estimated the value of these benefits over a 20-year period, beginning in full in 2008 or 2009 and growing each year. MCC developed its project cost estimates based on existing cost estimates prepared for the government of Vanuatu and for another donor. To determine the number of poor, rural beneficiaries, MCC defined a catchment area—the geographic area in which benefits may be expected to accrue—using maps of Vanuatu and data from the most recent Vanuatu census. Using its projected benefit and cost data, MCC calculated (1) the compact's ERR, comparing projected benefits to projected costs; (2) per capita income, determining the total benefits and dividing the total value by Vanuatu's baseline population; and (3) the compact's effect on Vanuatu's GDP by computing the total benefits added to the economy.

MCC's portrayal of the Vanuatu compact's impact does not reflect the data and analysis underlying its projections of the compact's benefits. MCC states that as a result of the compact, per capita income will increase by approximately \$200, or 15 percent, by 2010 and \$488, or 37 percent, by

2015. This statement suggests that per capita income in 2010 and 2015 will be, respectively, 15 percent and 37 percent higher than without the compact. However, MCC's underlying data show that these figures represent the sum of gains in per capita income for individual years relative to 2005 rather than actual, or net, annual gains as of 2010 or 2015. For example, MCC sums the per capita income gains relative to 2005 for 2006 to 2010, averaging 3 percent, as 15 percent in 2010, without stating that these gains are cumulative. Our analysis of MCC's data shows that actual gains in per capita income, relative to income in 2005, would be \$51, or 3.9 percent, in 2010 and \$61, or 4.6 percent, in 2015. Likewise, MCC states that Vanuatu's GDP will increase by "an additional 3 percent a year." However, MCC's underlying data and calculations show that while the level of Vanuatu's GDP will grow by 6 percent in 2007, the economy's growth rate in subsequent years continues at approximately 3 percent, MCC's assumed rate without the compact. Regarding MCC's portrayal of the compact's impact on poverty reduction, MCC's publicly available documents state that the compact is expected to benefit approximately 65,000 poor, rural inhabitants "living nearby and using the roads to access markets and social services." However, MCC's underlying documentation shows that these 65,000 beneficiaries will not receive the majority of the benefits but will instead share the 43 percent of the compact's monetary benefits that MCC expects to go to the local population; the remaining 57 percent will go to beneficiaries such as tourism services providers, transport companies, and local businesses. Finally, although MCC's estimates of compact benefits and beneficiaries are generally reasonable, some of the calculations and assumptions it used are problematic. Correcting MCC's calculations of per capita income benefits slightly reduces the estimated benefit, and correcting MCC's calculations and fully discounting some of its assumptions regarding the count of beneficiaries would reduce estimated beneficiaries on Santo and Efate by about one-third.

We identified five key risks that could affect the Vanuatu compact's projected impact on poverty reduction and economic growth.

- The contingencies included in MCC's calculations of construction costs may not be sufficient to cover potential cost overruns. We received MCC cost estimate documentation for 5 of MCC's 11 construction projects showing that MCC's estimates for these 5 include design contingencies of 20 percent; however, a previous study found average cost overruns of more than 20 percent in transportation infrastructure projects in other countries. Further, the risk of excessive cost overruns is significant in a

small country such as Vanuatu. Any construction cost overrun could cause MCC to reduce the compact's scope and therefore its benefits.

- Although the compact's benefits are projected to begin shortly after completion of the projects, some of these benefits will likely accrue more slowly. For example, according to agricultural and timber producers, their businesses will likely respond gradually to any increased market opportunities.
- Whereas the benefit projections assume continued maintenance of completed projects, MCC's ability to ensure such maintenance will end in 2011. Moreover, previous donors to Vanuatu have found Vanuatu's record of maintaining donor projects to be poor. Reduced maintenance would lead to reduced benefits from the project.
- The projected induced benefits from expanded tourism and agriculture depend on businesses and rural inhabitants responding to opportunities created by improved infrastructure.
- Efficiency gains that MCC counts as direct benefits, such as time saved in transit, may not be put to economic use and result in increased per capita income, as MCC projects.

Our analysis of these areas of risk illustrates the extent to which MCC's benefit projections are dependent on assumptions of immediate realization of benefits, successful long-term maintenance, realization of induced benefits, and benefits from efficiency gains. Accounting for these risks can reduce overall compact ERR from 24.2 percent, as projected by MCC, to between 5.5 percent and 16.5 percent, and some projects may have a negative ERR.⁷

To help better express and determine the impact of its compacts, this report recommends that the Chief Executive Officer (CEO) of MCC (1) revise the public reporting of the projected impact of the Vanuatu compact, (2) assess whether similar statements in other compacts accurately reflect underlying data, and (3) improve MCC's economic

⁷We modeled risk scenarios by first assuming the phasing of costs and benefits. We then combined this phasing with three additional models that assumed a lack of maintenance, a lack of induced benefits, and a lack of monetized efficiency gains. See appendix V for more information about our methodology.

analysis by phasing costs and benefits and more fully accounting for risks to project benefits.

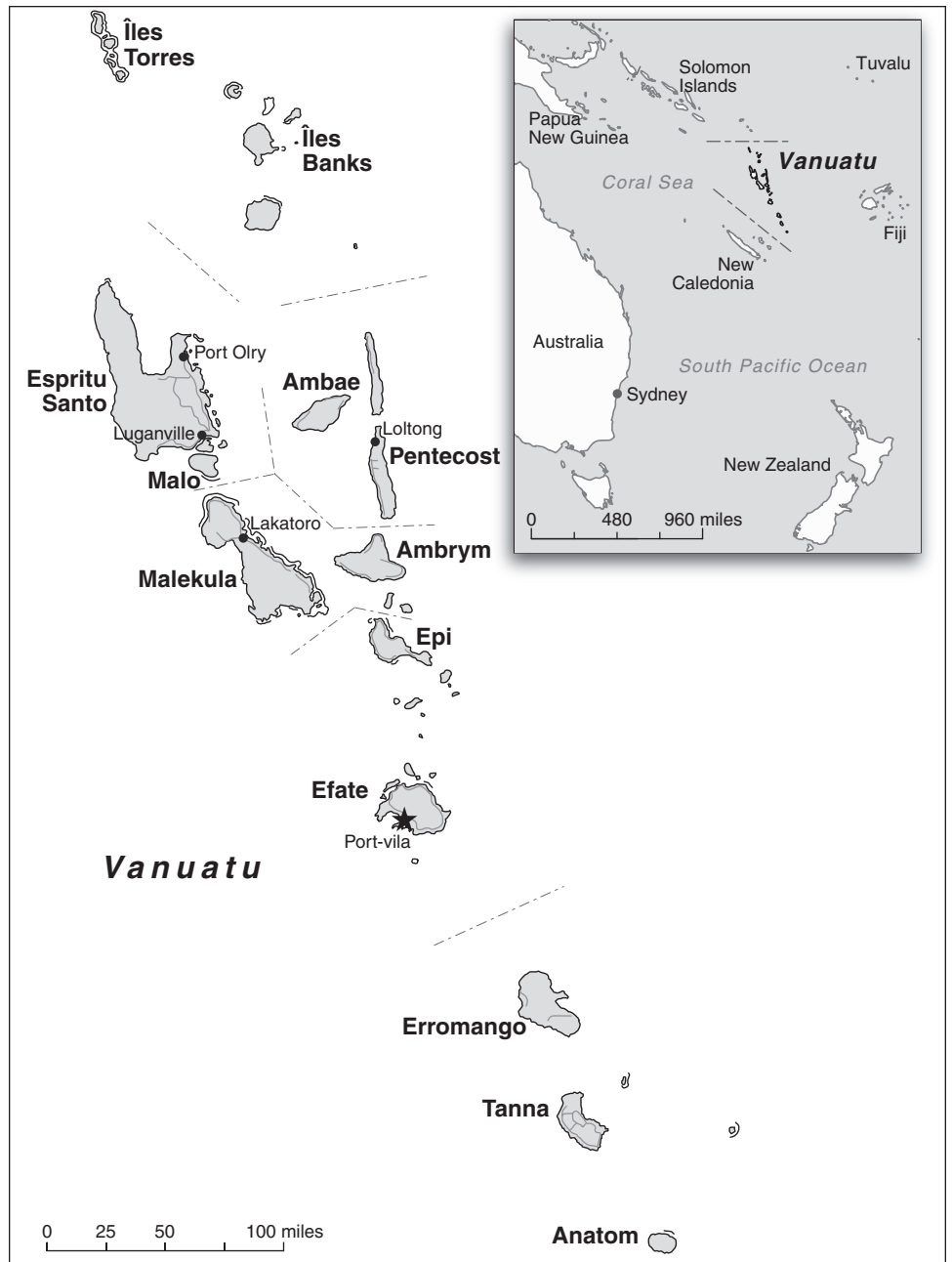
We provided a draft of this report to MCC. In commenting on the draft, MCC did not directly acknowledge our recommendations. MCC acknowledged that its use of projected cumulative compact impact on income and growth was misleading, but asserted that it had no intention to mislead and that its portrayal of projected compact benefits was factually correct. MCC questioned our finding that its underlying data and analysis do not support its portrayal of compact benefits and our characterization of the program's risks. In response to MCC's comments, we clarified the terms and presentation of our analysis of MCC's statements and data and provided additional information on the basis for our findings. We also provided technical corrections where appropriate.

Background

Description of Vanuatu

Vanuatu consists of 83 islands spread over hundreds of miles of ocean in the South Pacific, 1,300 miles northeast of Sydney, Australia (see fig. 1). About 39 percent of the population is concentrated on the islands of Santo and Efate. Vanuatu's capital, Port Vila, is on Efate, and Vanuatu's only other urban center, Luganville, is on Santo. The country has three official languages—English, French, and Bislama—but more than 100 other dialects are also spoken. Traditional custom chiefs have a significant role in the state particularly in rural areas. Civil unrest has caused occasional disruptions; for example, riots erupted in Port Vila over the misappropriation of assets from the Vanuatu National Provident Fund in 1998, and an ethnic conflict on Efate led Vanuatu's parliamentary government to declare a state of emergency in March 2007.

Figure 1: Location of Vanuatu



Sources: GAO based on MCC data; Map Resources (map).

Vanuatu's Economy

In the past decade, Vanuatu's real GDP growth averaged 2 percent, although more rapid population growth led to a decline in per capita GDP over the same period. Average growth of real GDP per capita was negative from 1993 to 2005. In its economic analyses, MCC used a baseline 2005 Vanuatu per capita income of \$1,326. An estimated 40 percent of Vanuatu's population of about 207,000 has an income below the international poverty line of \$1 per day. Agriculture and tourism are the principal productive sectors of Vanuatu's economy, contributing approximately 15 percent and 19 percent to GDP, respectively. Although agriculture represents a relatively small share of Vanuatu's overall economy, approximately 80 percent of Vanuatu's residents live in rural areas and depend on subsistence agriculture for food and shelter, selling surplus commodities to generate cash for school fees, transportation, consumer goods, and services. Copra (dried coconut) is the main cash crop; kava and cacao are also grown. The tourism sector is dominated by expatriates of foreign countries living in Vanuatu, who also predominate in other formal sectors of the economy such as plantation agriculture and retail trade. According to the Asian Development Bank (ADB), tourism is one of the most promising sectors in Vanuatu in terms of its potential for earning foreign exchange and generating employment. According to a survey conducted by the Vanuatu National Statistics office, the largest markets for Vanuatu tourism are Australia and New Zealand. Despite prior donor efforts, private sector development in Vanuatu's tourism and agricultural sectors faces challenges, including political uncertainty, and high costs of doing business. (See app. II for a summary of donor efforts and Vanuatu's development challenges.)

MCC's Compact with Vanuatu

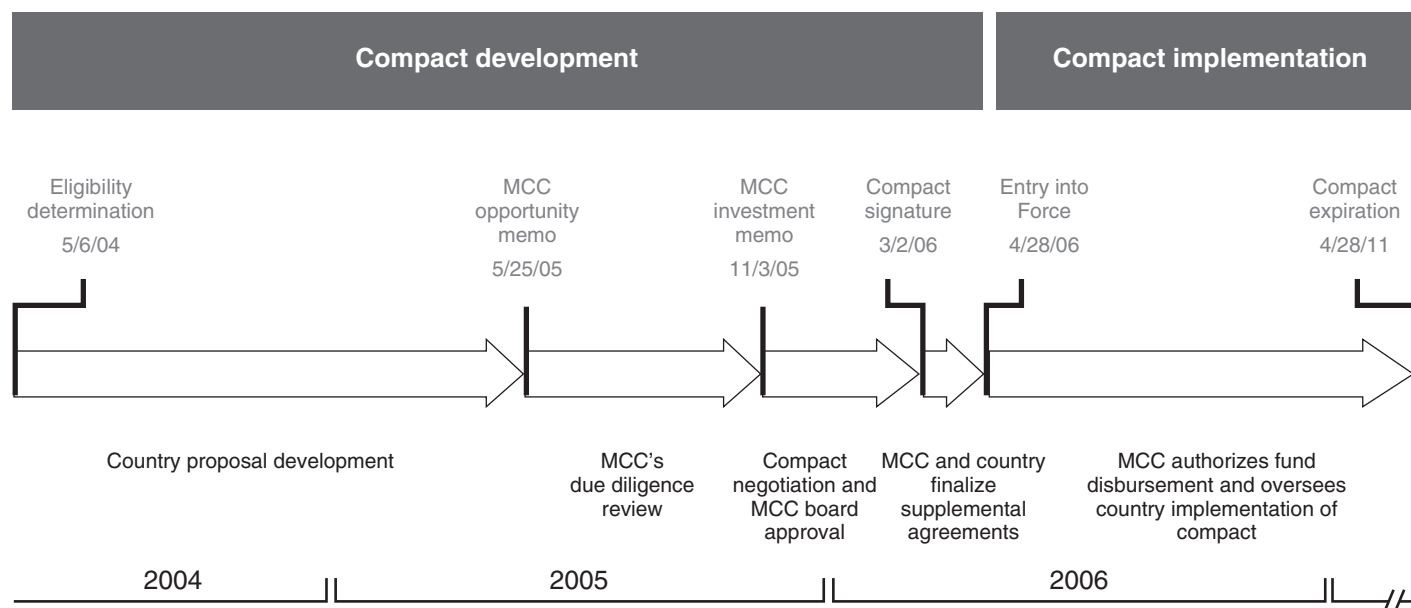
On May 6, 2004, MCC determined that Vanuatu was eligible to submit a compact proposal for Millennium Challenge Account (MCA) funding.⁸ Vanuatu's proposal identified transportation infrastructure as a key constraint to private-sector development. Based on the analysis performed

⁸The Millennium Challenge Act of 2003 requires MCC to determine whether countries are eligible for MCA assistance each fiscal year. Countries with per capita income at or below a set threshold may be selected as eligible for assistance if they meet MCC indicator criteria and are not statutorily barred from receiving U.S. assistance. MCC uses 16 indicators divided into three categories: Ruling Justly, Encouraging Economic Freedom, and Investing in People. To be eligible for MCA assistance, countries must score above the median relative to their peers on at least half of the indicators in each category and above the median on the indicator for combating corruption. GAO, *Millennium Challenge Corporation: Compact Implementation Structures Are Being Established; Framework for Measuring Results Needs Improvement*, GAO-06-805 (Washington, D.C.: July 28, 2006).

during approximately 5 months of due diligence,⁹ MCC signed a 5-year, \$65.7 million compact with the government of Vanuatu on March 2, 2006, with entry into force¹⁰ on April 28, 2006.¹¹ In keeping with its statutory requirements, MCC submitted a congressional notification of the compact signing on March 7, 2006.

Figure 2 illustrates the chronology of the development and implementation of the Vanuatu proposal and compact.

Figure 2: Development and Implementation of Vanuatu Compact



Source: GAO analysis of MCC data contained in Investment Memo.

⁹Prior to the due diligence process, a transaction team conducts a preliminary assessment of each proposal and reports its findings in an internal "opportunity memo" to the MCC investment committee. If the opportunity memo is approved, the team launches a detailed due diligence review, using MCC's published proposal guidelines and criteria to analyze project costs and benefits and assess the proposal's consultative process, rationale, environmental and social impact, and sustainability. The transaction team makes recommendations based on its assessment of the proposal in an investment memo to the MCC investment committee.

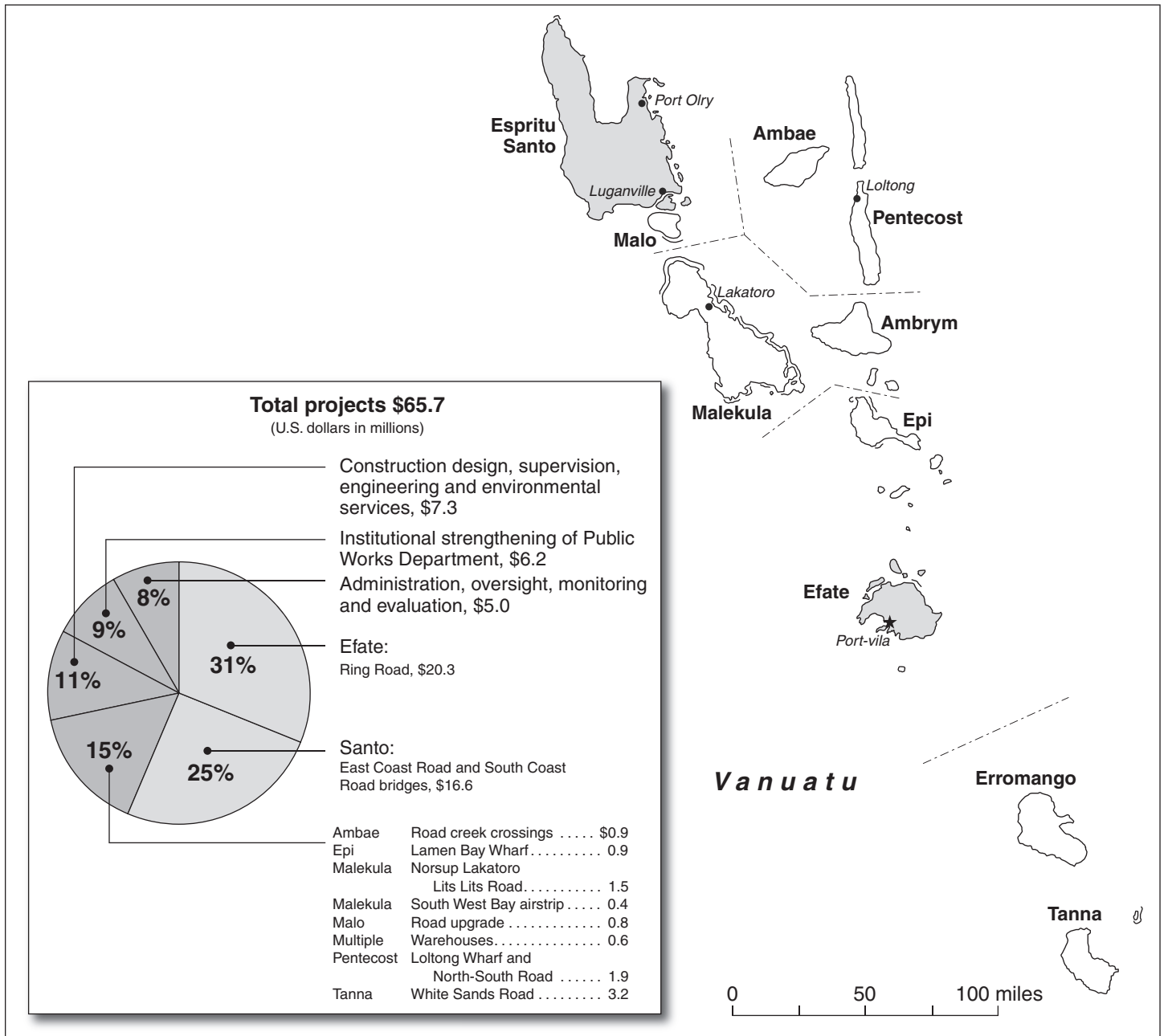
¹⁰MCC and the country's accountable entity must complete supplemental agreements, including a disbursement agreement and a procurement agreement, before the compact enters into force and funds are disbursed.

¹¹By U.S. law, all compacts must end within 5 years of entry into force.

The \$65.7 million Vanuatu compact includes \$54.5 million for the rehabilitation or construction of 11 transportation infrastructure assets on 8 of Vanuatu's 83 islands, including roads, wharves, an airstrip, and warehouses (see fig. 3). The compact also includes \$6.2 million for an institutional strengthening program to increase the capacity of the Vanuatu Public Works Department (PWD) to maintain transportation infrastructure.¹² The remaining \$5 million is for program management and monitoring and evaluation. More than half of the compact, \$37 million, is budgeted for three road projects on Santo and Efate islands. On both islands, the compact will upgrade existing roads, while on Santo the compact also includes five new bridges on an existing road. To oversee and manage the compact programs, the Vanuatu government has established MCA-Vanuatu, an independent entity housed within the Vanuatu Ministry of Finance and Economic Management.

¹²The institutional strengthening program includes \$5.74 million for equipment purchases; of this amount, \$1.4 million is provided directly to PWD and the remainder will purchase equipment for the use of the MCC construction contractor, to be turned over to the PWD in specified condition 4 years later.

Figure 3: MCC Vanuatu Projects by Size and Location



Sources: GAO based on MCC data; Map Resources (map).

The compact and the congressional notification state that the compact will have a transformational impact on Vanuatu's economic development, increasing average per capita income by approximately \$200—15 percent—by 2010 and increasing total GDP by “an additional 3 percent a year.” The investment memo further quantifies the per capita income increase as \$488—37 percent—by 2015. The compact and the congressional notification further state that the compact will provide benefits to approximately 65,000 poor, rural inhabitants (see fig. 4).

Figure 4: MCC Statement of Impacts in March 2006 Congressional Notification

“The Transport Infrastructure Project is expected to have a transformational impact on Vanuatu's economic development, increasing average income per capita (in real terms) by approximately \$200, or 15 percent of current income per capita, by 2010. GDP is expected to increase by an additional 3 percent a year, as a result of the program.

Based on the areas covered by the transport assets, the program can be expected to benefit approximately 65,000 poor, rural inhabitants living nearby and using the roads to access markets and social services.”

Source: MCC Congressional Notification, March 2006.

MCC Projected Compact's Impact Using Estimates of Benefits, Costs, and Catchment Area

To project the Vanuatu compact program's benefits, costs, and beneficiaries and calculate the compact's impact on per capita income, GDP, and poverty reduction, MCC made site visits to Vanuatu and reviewed available documents to gather needed data. MCC determined that investments in transportation infrastructure will lead to increases in incomes and used the available data and made assumptions to determine the compact's benefits and costs. MCC also estimated the number of beneficiaries within a defined catchment area—the geographic area in which benefits may be expected to accrue. MCC then used the benefits and costs to calculate summary statistics about the compact's ERR and effects on Vanuatu's GDP and per capita income.

MCC Calculated Benefits, Costs, and Beneficiaries

To prepare its economic analyses of the compact program's benefits, costs, and number of beneficiaries, MCC sent a team of employees and contractors to Vanuatu. The contractor MCC retained had previously served as a consultant to the ADB in Vanuatu and had prepared a multiyear study of projects proposed to the ADB as part of its Vanuatu Outer Islands Infrastructure Development Project in 2000 to 2003. Seven of MCC's 11 transportation infrastructure projects were initially developed as

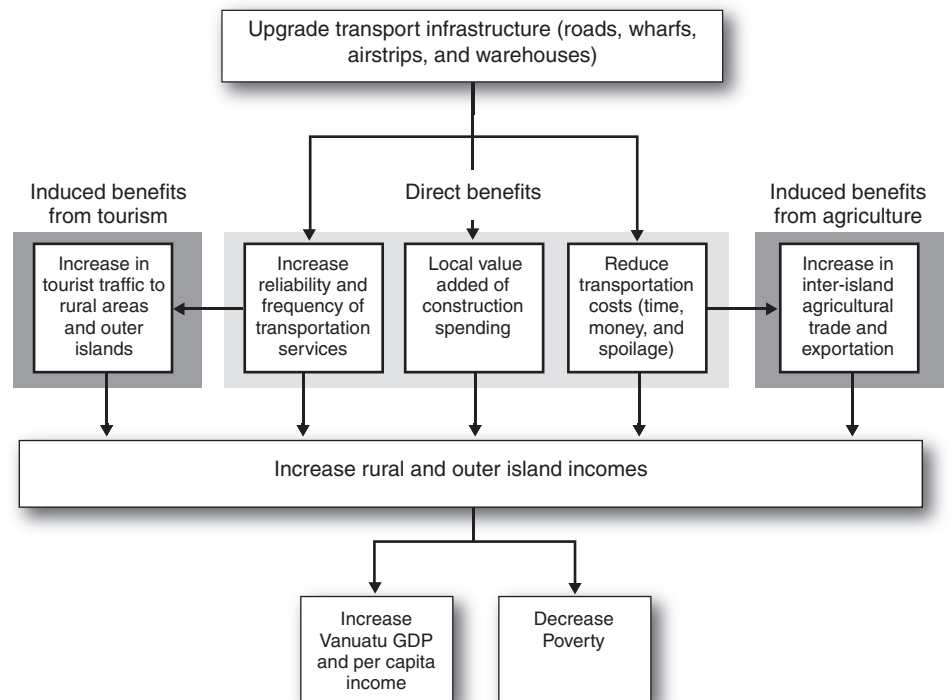
part of the ADB study. While in Vanuatu, the MCC team met with officials representing other donors, Vanuatu's Department of Economic and Sectoral Planning, the National Statistics Office, and the Vanuatu PWD, among others. The MCC team also met with a number of interested and informed parties representing the transportation, tourism, and agriculture sectors and reviewed a number of documents to gather the information needed for its economic analyses.¹³

Benefits

MCC's compact aims to benefit poor, rural agricultural producers and providers of tourism-related goods and services by reducing transportation costs and improving the reliability of access to transportation services. MCC's logic model for the compact posits that improvements in infrastructure will lead to (1) direct benefits from increased transportation reliability, construction spending, and reduced transportation costs and (2) induced benefits from greater tourism and agricultural trade. The direct and induced benefits in turn lead to increases in per capita income and GDP and reduction in poverty (see fig. 5).

¹³MCC used Vanuatu statistical surveys such as the Vanuatu 1999 Household Income and Expenditure Survey, 1993 Agricultural Survey, 2004 Tourist Survey, and a monthly Hotel Occupancy Survey as baseline data sources. Some data were updated to 2005 values from earlier data based on growth factors. MCC assessed the data it used as the best available, but noted that some data have shortcomings. Other data—such as the amount of spending by expatriates in Vanuatu, and the percentage of tourist spending that remains in the country—were not available, and MCC had to estimate their value. Since signing the compact with Vanuatu, MCC has funded additional surveys to improve the quality of baseline data and track key compact performance indicators.

Figure 5: MCC's Logic Model for the Vanuatu Compact



Source: MCC, with GAO analysis.

MCC calculated several different direct and induced benefits for the compact's projects over a 20-year period. Direct benefits include the local value added of construction spending in the economy, reduced spoilage of agricultural goods, time saved in transit on the improved roads, and reduced user costs for operators of ships, aircraft, and vehicles.¹⁴ Induced benefits are those projected to result from Vanuatu's response to new economic opportunities in tourism and agriculture. For example, MCC assumes that the projects will cause Vanuatu tourism to grow at 7 percent

¹⁴MCC determined reduced road user costs by means of (1) traffic counts prepared by Vanuatu's PWD and MCA-Vanuatu for the MCC and (2) an estimation of road user costs per kilometer based on the Highway Design and Maintenance Standards Model (HDM)-III developed by the World Bank. HDM-III is a software package that provides the economic decision criteria for evaluating road construction or maintenance strategies. MCC determined the costs to road users by multiplying the average annual daily traffic on the road by the length of the road and by the average road user cost per kilometer. Road user cost includes vehicle operating costs and the value of passengers' time. The difference in user cost before and after construction provides the benefit.

per year instead of the recent rate of 5 percent; tourists will increase their daily spending; new hotel rooms will be constructed and hotel occupancy will increase; and crop, livestock, and fisheries production will increase. Benefits from the completed projects are counted as beginning in full in 2008 or 2009 and are assumed to increase a minimum of 3 percent every year thereafter. MCC expects the benefits of the compact to flow from different sources, depending on the project and its location. In Efate, the Ring Road is expected to provide direct benefits from decreased road user costs and induced benefits through tourism and foreign resident spending. In Santo, MCC anticipates benefits from all of these efforts, as well as the induced benefit of increased agricultural production. On other islands, where tourism is not as developed, the benefits primarily derive from user cost savings and increased agriculture.¹⁵

Costs

To calculate compact construction and maintenance costs, MCC used existing data from previous contractor studies and data from the Vanuatu PWD. In MCC's economic model, construction costs are assumed to be incurred in the first year after compact signing. Although listed on the cost side of the model, MCC also counted the effect of the construction spending on the economy as a benefit in the year it takes place.¹⁶ According to MCC's contractor, it used two different primary sources in developing the MCC cost estimates:

- The contractor used its own 2003 analysis for the ADB projects and updated its analysis to account for inflation and changes in project scope.
- The contractor used a cost analysis prepared by a different contractor for the government of Vanuatu, dated approximately 2004, as a basis for MCC's cost estimates for the Santo and Efate projects. MCC's contractor then prepared a new estimate because MCC's projects had a different scope of work. We requested from MCC a copy of the original report to the government of Vanuatu. According to MCC officials, MCC did not have it and the government of Vanuatu was not willing to provide the report to MCC for our review. These Santo and Efate projects represent 56 percent of compact cost.

¹⁵Although not included in the economic analyses, other benefits may accrue to Vanuatu from the MCC compact. Increased economic activity in tourism may have spillover benefits for other sectors of the economy, and the welfare of Vanuatu's citizens may improve due to increased access to health care and educational opportunities.

¹⁶MCC assumed that 16 percent of the total cost of construction would be captured in the local economy and counted this as a benefit.

MCC assumed a cost for continued annual maintenance based on past estimated maintenance costs provided by the PWD. MCC applied assumptions and estimated maintenance costs based on incomplete information, because the PWD did not track maintenance costs in its budget. For some projects, MCC assumed that maintenance costs would decrease once the construction project was complete. MCC also estimated and included the cost of a periodic major reinvestment for some projects. For example, on the Efate Ring Road, MCC assumed a cost for rehabilitation in 2017 and 2026.

Beneficiaries

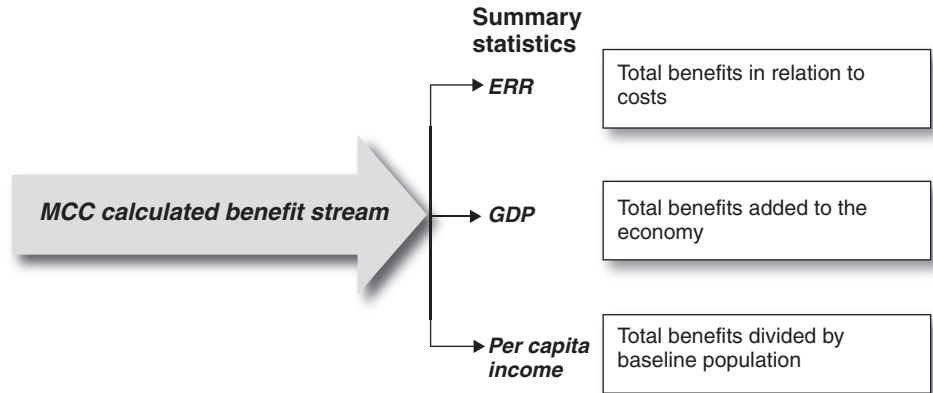
MCC assessed the number of poor, rural beneficiaries by determining the catchment area—the geographic area in which benefits may be expected to accrue. For example, MCA-Vanuatu officials told us that they defined the catchment area in Efate as consisting of villages within 3 miles of the rehabilitated Efate Ring Road. MCC used Vanuatu maps to identify villages in the catchment area and used the 1999 Vanuatu National Population and Housing Census to determine the number of persons living in those villages. In all, MCC calculated that approximately 65,000 poor, rural people on the eight islands would benefit from MCC projects.

MCC Used Projected Benefits and Costs to Determine ERR and Effects on GDP and Per Capita Income

MCC used its projection of costs and benefits over a 20-year period as the basis for calculating three summaries of the compact's impact: its ERR, effect on per capita income, and effect on GDP (see fig. 6). The compact's ERR reflects the ratio of the benefits of the compact in relation to its costs, expressed as a percentage. For the Vanuatu compact, MCC reported an overall compact ERR of 24.7 percent over 20 years.¹⁷

¹⁷In its final April 2006 economic analysis, MCC adjusted this calculation downward slightly to 24.2 percent.

Figure 6: MCC Benefits Calculations as Source of Statements about Impact of Vanuatu Compact



Source: GAO analysis of MCC data.

MCC also prepared a sensitivity analysis to assess how a range of possible outcomes would affect compact results. MCC's tests included

- a 1-year delay of the start date for accrued benefits;
- a 20 percent increase of all costs;
- a 20 percent decrease of all benefits; and
- a "stress test," with a 20 percent increase of all costs and a 20 percent decrease of all benefits.

MCC tested a best-case scenario based on a 10 percent increase in benefits and a 10 percent decrease in costs. For the overall compact, MCC calculated a best-case ERR of 30.2 percent and worst-case of 13.9 percent. MCC also used the cost and benefit data for the compact projects to determine the projects' expected impacts on Vanuatu's per capita income and GDP.

MCC's Data Do Not Support Its Portrayal of Compact Benefits

The anticipated benefits of the Vanuatu compact that MCC stated in March 2006 in the compact and in its Congressional Notification do not accurately reflect MCC's supporting data. MCC projects an increase in per capita income of \$200 by 2010, but this increase is cumulative; MCC's underlying analysis shows a projected increase of \$51 in 2010. Similarly,

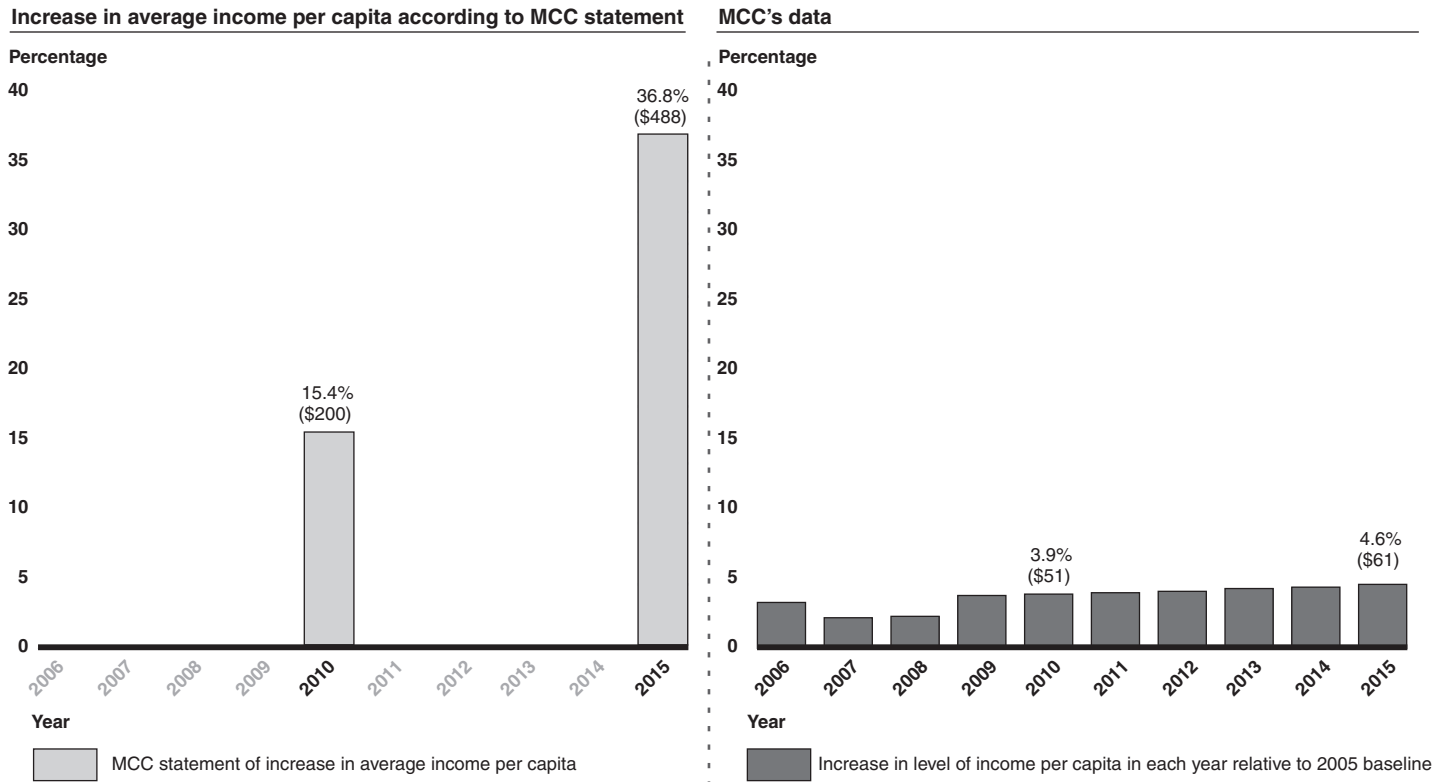
while MCC's statement about the compact's transformational effect on GDP could be interpreted as increasing the growth rate, the projected effect on GDP represents an increase to the level, not the growth rate, of GDP. The supporting data show the growth rate remaining roughly the same as it would be without the compact. In addition, the 65,000 rural poor cited by MCC may share less than half of the compact's benefits with others in Vanuatu who are not poor or not rural. In addition, although MCC's estimates of project benefits and beneficiaries are generally reasonable, MCC made some calculation errors and questionable assumptions in developing these estimates. Correcting MCC's calculations of the per capita income benefit slightly reduces the benefit to \$49, or 3.7 percent, in 2010; correcting calculations and fully discounting some of MCC's assumptions regarding beneficiaries would reduce the estimate of beneficiaries on Santo and Efate by about one-third.

Portrayal of Per Capita Income Benefit Suggests Larger Effect Than Data Support

MCC's portrayal of the compact's projected impact suggests a greater effect on Vanuatu's per capita income than its analysis supports. In its publicly available documents such as the Vanuatu compact, and the congressional notification, issued in March 2006, MCC states that the transportation infrastructure project "is expected to have a transformational impact . . . increasing average income per capita (in real terms) by approximately \$200, or 15 percent of current income per capita, by 2010." In addition, MCC's investment memo states that the compact will cause per capita income to increase by \$488, or 37 percent, by 2015.

MCC's statements suggest that as a result of the program, average incomes in Vanuatu will be 15 percent higher in 2010 and 37 percent higher in 2015 than they would be without the compact. However, MCC's underlying data show that these percentages represent the sum of increases from per capita income in 2005 that MCC projects for each year. For example, according to MCC's data, Vanuatu's per capita income in a given year between 2006 and 2010 will range from about 2 percent to almost 4 percent higher than in 2005; however, MCC sums these percentages as 15 percent, without stating that this percentage is a cumulative increase from 2005. Our analysis of MCC's data shows that actual gains in per capita income, relative to income in 2005, would be \$51, or 3.9 percent, in 2010 and \$61, or 4.6 percent, in 2015 (see fig. 7).

Figure 7: Vanuatu Compact’s Projected Impact on Real Per Capita Income According to MCC Statement and MCC Data Relative to 2005 Per Capita Income

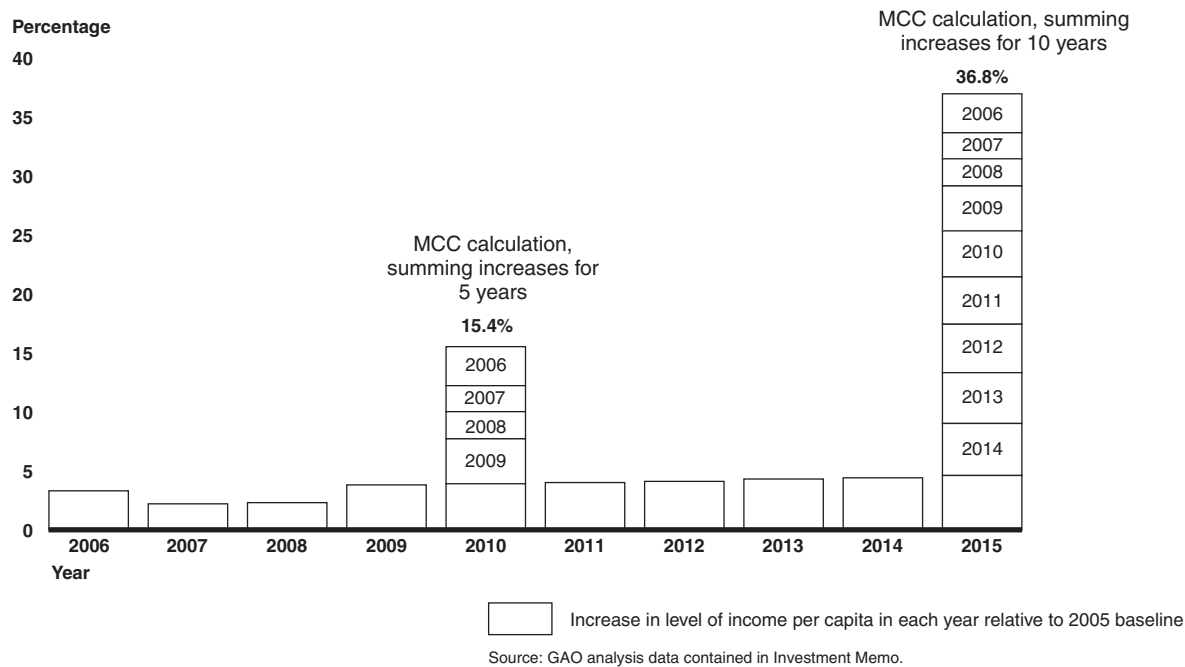


Source: GAO analysis of MCC data contained in Investment Memo.

Note: MCC’s statement: “Increasing average income per capita (in real terms) by approximately \$200 or 15 percent of current income per capita by 2010” and by \$488—37 percent—by 2015.

Figure 8 further illustrates MCC’s methodology in projecting the compact’s impact on per capita income levels for 2010 and 2015.

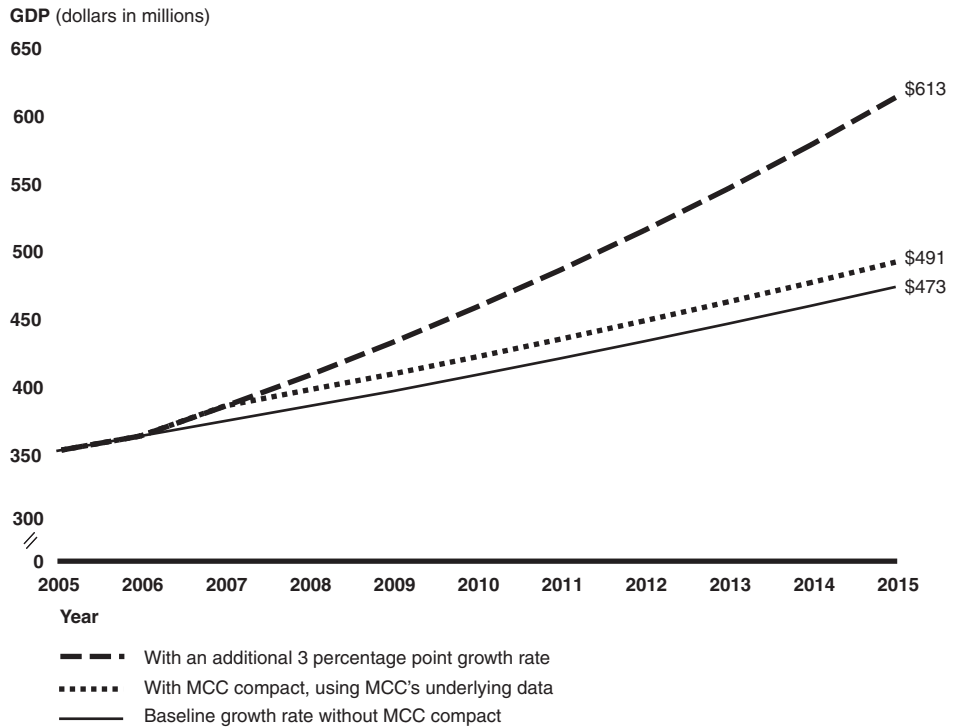
Figure 8: MCC Methodology for Projecting Vanuatu Compact’s Impact on Real Per Capita Income



Portrayal of GDP Benefit Differs from Underlying Analysis

Like its portrayal of the per capita income benefit, MCC’s portrayal of the program’s GDP impact differs from that supported by the underlying data. In the compact and the 2006 Congressional Notification, MCC states that the compact will have a transformational effect on Vanuatu’s economy, causing GDP to “increase by an additional 3 percent a year.” Given the GDP growth rate of about 3 percent that MCC expects in Vanuatu without the compact, MCC’s statement of a transformational effect suggests that the GDP growth rate will rise to about 6 percent. However, MCC’s underlying data show that although Vanuatu’s GDP growth rate will rise to about 6 percent in 2007, in subsequent years the GDP growth rate will revert to roughly the rate MCC assumes would occur without the compact, approximately 3 percent (see fig. 9). Although MCC’s data show that the compact will result in a higher level (i.e., dollar value) of GDP, the data do not show a transformational increase to the GDP growth rate.

Figure 9: Vanuatu GDP Growth with and without MCC Compact



Source: GAO analysis of MCC data.

Notes:

According to MCC, “GDP is expected to increase by an additional 3 percent a year as a result of the MCA program.”

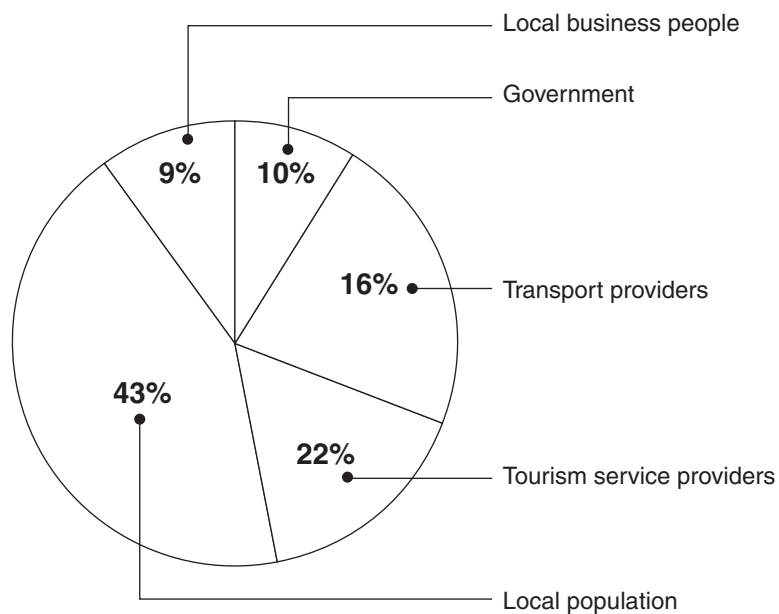
According to MCC data, the compact will have a small impact on GDP growth rate in later years. In 2010 to 2015, the GDP growth rate resulting from the compact will be 3.1 percent, compared with 3 percent without the compact.

Portrayal of Poverty Reduction Does Not Quantify Benefits to Rural Poor

MCC’s portrayal of the compact’s projected impact on poverty does not identify the proportion of the financial benefits that will accrue to the rural poor. In the compact and the Congressional Notification, MCC states that the program is expected to benefit “approximately 65,000 poor, rural inhabitants living nearby and using the roads to access markets and social services.” However, in its underlying documentation, MCC specifies that 43 percent of the monetary benefits are expected to go to the local population. The remaining 57 percent of the benefits are expected to accrue to other beneficiaries, including expatriate tourism services providers, transport providers, government, and local businesses (see fig. 10). Given that many of MCC’s benefits flow to the expatriate-dominated

tourism sector, MCC makes an appropriate assumption that the local population will not receive all the benefits. However, the compact, congressional notifications, and other publicly available MCC documents do not provide this information.

Figure 10: MCC Analysis of Distribution of Vanuatu Compact Benefits



Source: MCC analysis.

Note: MCC defines "local population" as comprising local producers, local consumers, and inhabitants of rural communities.

Although MCC expects that 43 percent of monetary benefits will go to the local population, MCC does not establish the proportion of local-population benefits that will go to the rural poor. Because MCC defines the local population as "local producers, local consumers and inhabitants of remote communities," the 65,000 poor, rural beneficiaries that MCC projects may share local-population benefits with those who are urban and are not poor.

Estimates of Compact Benefits Are Generally Reasonable, but Some Calculations and Assumptions Are Problematic

MCC's documentation states that it used conservative assumptions in developing its benefit estimates. Although our fieldwork and meetings in Vanuatu generally affirmed MCC's assumptions about benefits, many participants in our Vanuatu discussion groups noted that the positive impacts of the MCC compact are contingent on other factors, such as the development of tourist facilities and activities. However, our review of MCC's analyses identified some calculation errors in its determination of the compact's impact on per capita income and estimation of the number of compact beneficiaries, as well as questionable assumptions in regard to the beneficiary population. (See app. III for a detailed discussion of these calculation errors and the effect of MCC's assumptions.)

- *Calculation errors.* To determine per capita income effects, MCC incorrectly adjusted the value of a benefit stream for inflation that was already presented in real (i.e., inflation-adjusted) terms. In addition, MCC failed to account for population growth in projecting per capita income effects from the compact. Although these errors largely cancel each other, correcting them reduces MCC's projection of the per capita income benefit slightly, from \$51 to \$49 in 2010 and from \$61 to \$57 in 2015. Correcting calculation errors significantly increases the number of rural beneficiaries; MCC's estimate of compact beneficiaries in Santo and Efate did not take into account population growth since the 1999 census.
- *Assumptions.* Our analysis of MCC's data for Santo and Efate indicates that MCC's count of beneficiaries may be overestimated. MCC's count of poor, rural beneficiaries includes all rural inhabitants in the catchment area, indicating that MCC assumes that all rural inhabitants are poor. However, according to ADB reporting, rural poverty in Vanuatu is widespread but not universal. The poverty level, defined as having an income of one U.S. dollar per day, is 51 percent in rural areas.¹⁸ Further, in defining the catchment areas in Efate and Santo, MCC assumed that residents of villages near existing paved portions of the Ring Road not improved by MCC, as well as those on off-shore islets, would benefit fully from the compact.

Correcting calculation errors and fully discounting MCC's assumption including these residents in the catchment area would reduce the beneficiary count on Efate and Santo by 32 percent—from 26,553, as

¹⁸In its Vanuatu Monitoring and Evaluation Plan, MCC is using the poverty measure proposed by Vanuatu, the fraction of individuals with monthly cash income less than 20,000 vatu (approximately \$185 U.S. dollars or \$6 per day).

stated by MCC, to 18,070—indicating that MCC may overestimate the compact’s beneficiaries.

Several Risks May Lead to Reduced Project Benefits

We identified five key risks that may affect the Vanuatu compact’s projected impact on poverty reduction and economic growth. First, the contingencies included in MCC’s calculations of construction costs may not be sufficient to cover average transportation project overruns. Second, although the compact’s benefits are projected to begin shortly after completion of the projects, some of these benefits are likely to accrue more slowly. Third, while the benefit projections assume continued maintenance of completed projects, MCC’s ability to ensure such maintenance will end in 2011, and Vanuatu’s record of road maintenance is poor. Fourth, the projected induced benefits from expanded tourism and agriculture depend on businesses and rural inhabitants responding to opportunities created by improved infrastructure. Fifth, efficiency gains, such as time saved in transit, may not result in increased per capita income, as MCC projects. Our analysis of these areas of risk illustrates the extent to which MCC’s projections of benefits are dependent on assumptions of immediate realization of benefits, successful long-term maintenance, realization of induced benefits, and benefits from efficiency gains.¹⁹

Construction Costs May Exceed Contingencies

Although MCC considered the risk of construction cost increases, the contingencies used in its calculations may not be sufficient to cover actual construction costs. We received documentation from MCC’s contractor of its MCC cost estimates for only 5 of MCC’s 11 construction projects. For these five, it used a design contingency of 20 percent.²⁰ In its due diligence book, MCC states that its cost estimates include physical contingencies, with an average value of 15 percent, and price contingencies, with an average value of 12 percent. However, cost overruns of more than 20

¹⁹We modeled risk scenarios with alternative methods of looking at compact benefits that assume phasing of costs and benefits and phasing coupled with lack of maintenance, lack of induced benefits, and lack of monetized efficiency gains. See appendix V for more information about our methodology.

²⁰For one of these five, the \$400,000 South West Bay airstrip project, the estimate also included an additional 10 percent construction contingency.

percent occur in many transportation projects.²¹ For example, a study of more than 250 transportation projects in Europe, North America, and elsewhere found that costs for all projects were 28 percent higher, on average, than forecasted at the time of decision to build, while road projects averaged escalations of 20.4 percent.²² Further, as MCC's analysis notes, the risk of excessive cost overruns is significant in a small country such as Vanuatu, because (1) few comparable projects have been undertaken in Vanuatu and, consequently, little previous cost information is available and (2) no local contractors are capable of undertaking a project of this size, and foreign contractors may apply large margins to cover unknown factors.²³ Any construction cost overrun must be made up within the Vanuatu compact budget by reducing the scope, and therefore the benefits, of the compact projects.²⁴ Reduced project benefits would in turn reduce the compact's ERR and effects on per capita income and GDP.

In addition, because MCC was unable to provide the data that it used to produce the estimates for the Santo and Efate projects, the project costs may be at further risk from unchecked assumptions and data (see app. IV).

²¹GAO recently reported this occurring as part of U.S. Agency for International Development (USAID)-funded road construction in a tsunami-affected area of Indonesia. In Indonesia, construction cost per mile increased by 75 percent, USAID reduced the length of road to be built by more than one third and the agency may extend the planned completion date by 5 months. GAO, *Foreign Assistance: USAID Signature Tsunami Reconstruction Efforts in Indonesia and Sri Lanka Exceed Initial Cost and Schedule Estimates and Face Further Risks*, GAO-07-357 (Washington, D.C.: February 28, 2007).

²²Bent Flyvbjerg, Mette Skamris Holm, and Soren Buhl, "Underestimating Costs in Public Works Projects: Error or Lie?," *Journal of the American Planning Association*, Vol. 68, No. 3 (2002), cited in GAO, *Highway and Transit Investments: Options for Improving Information on Projects' Benefits and Costs and Increasing Accountability for Results*, GAO-05-172 (Washington, D.C.: January 24, 2005).

²³MCC cites the "design-construct" contract proposed for the MCA program, which will include design and construction of all the projects as one package, as key to mitigating this risk. However, MCC's analysis also recognized that nonconstruction-related issues (such as access to parts of the project site) have the potential to delay the contractor and increase costs and that such issues can be significant for major road upgrade projects where the competing interests of the contractor, adjacent villages, and the general public must be balanced. MCC's analysis states that, to help manage the risk of project-related disputes and delays, MCC plans to have experienced consultants work with local PWD staff who have an understanding of the social and cultural issues.

²⁴According to the compact, the government of Vanuatu must pay any environmental mitigation and remediation costs in excess of the budget.

Compact Benefits Are Likely to Accrue More Slowly Than Projected

Although MCC's analysis assumes compact benefits from 2008 or 2009—shortly after the end of project construction—we found that benefits are likely to accrue more slowly. Our document review and discussions with tourism services providers and agricultural and timber producers suggest that these businesses will likely react gradually to any increased market opportunities resulting from MCC's projects, in part because of constraints to expanding economic activity.²⁵ For example:

- According to tourism officials and business owners, several types of activities need to progress to enable industry growth. Factors needed to foster tourism growth in Vanuatu include marketing Vanuatu as a tourist destination; promoting different types of products to different markets; improving domestic and international air and sea access; developing or upgrading the electric power, water, and road infrastructures; and recruiting and training workers. Tourism service providers in Santo and Efate identified improving air capacity as an important need.
- According to an official from the fisheries department in Santo, besides rough roads, the lack of ice-making equipment and lack of feed are important barriers to developing Santo's small-scale aquaculture.
- Timber production expands slowly; for example, a timber company owner in Santo stated that newly planted trees could not be harvested for about 15 years.
- In both Efate and Santo, feeder roads are in worse condition than the project roads and are critical to agriculture shipments.²⁶

These constraints suggest that future benefits related to tourism and agriculture will be phased in once transportation infrastructure is improved. Moreover, MCC assumes all construction costs will be incurred in the first year, instead of phasing these costs over the multiyear construction schedule. Our analysis shows that if costs are phased over

²⁵Benefits from construction activities may also be reduced by a delayed procurement. MCA-Vanuatu officials initially told us they anticipated issuing an invitation for bid to contractors by the end of February 2007. As of May 2007, the invitation had not yet been issued. MCC currently expects construction to begin in 2008, further reducing the likelihood of benefits starting in 2007 as MCC anticipated in its analyses.

²⁶It is unclear whether responsibility for feeder roads lies with the government at the central or provincial level; neither takes responsibility. The Santo PWD expects to focus on maintaining feeder roads once the East Coast Road is done.

3 years and benefits are phased over 5 years, overall compact ERR declines from 24.2 percent, as projected by MCC, to 16.5 percent (see app. V).

Project Maintenance after Compact Expiration Cannot Be Ensured

Uncertainty about the maintenance of completed transportation infrastructure projects after 2011 may affect the compact's projected benefits. According to World Bank and ADB officials, continuing donor involvement is needed to ensure the maintenance and sustainability of completed projects. In addition, during our visits to Efate and Santo, tourism and agriculture business representatives cited continued road maintenance as a critical concern. However, although MCC has budgeted \$6.2 million for institutional strengthening of the Vanuatu PWD, MCC has no means of ensuring the maintenance of completed projects after the compact expires in 2011; the Millennium Challenge Act limits compacts to 5 years.

Although the conditions precedent²⁷ to the Vanuatu compact require the government's commitment to ongoing project maintenance, World Bank and ADB officials told us, based on their experience with Pacific countries, that covenants such as these are difficult to enforce after the project is completed and often are not effective in ensuring sustainability. According to Vanuatu government officials, funds from vehicle registration and related fees are available for maintenance of the completed projects; however, the government has not dedicated these funds for this purpose. In addition, according to donor reporting, the government has failed to sustain maintenance of previous donor projects, primarily because of a lack of funds and a shortage of resources, skills, and capabilities. Some of the department's equipment on Santo Island is more than 27 years old, and newer equipment remains idle for long periods because spare parts are scarce; overall, the department lacks adequate equipment for Santo's 1,000-kilometer road network. Although the compact provides funds for equipment and for technical assistance to increase capacity, MCC cannot ensure the maintenance of infrastructure after the compact ends.

²⁷ Conditions precedent are specific steps that must be completed by the compact country prior to MCC's providing a disbursement. According to MCC officials, the government has thus far met or exceeded the requirements of these conditions.

Poor maintenance performance will reduce the benefits projected in the MCC compact.²⁸ Our analysis shows that with phasing of costs and benefits, no large periodic maintenance expenditures, and inadequate maintenance performance, overall compact ERR decreases from 24.2 percent, as projected by MCC, to 16.5 percent with phasing and to 13.8 percent without maintenance.²⁹

Induced Benefits Require Tourism Providers and Agricultural Producers to Respond to Opportunities

The compact's induced benefits depend on the response of Vanuatu tourism providers and agricultural producers. However, constraints affecting these economic sectors—such as the air-passenger capacity limitations that affect Vanuatu's tourism—may prevent the sector from expanding as MCC projects, affecting the reliability of MCC's estimate of program benefits.

Some development assistance organizations do not include induced benefits in calculations of ERR. In particular, World Bank officials told us they have not considered induced benefits in economic analyses of infrastructure for 10 years, because they deem such benefits too conjectural and subject to manipulation.³⁰ For example, if a projected road

²⁸In technical comments on a draft of this report, the World Bank noted that initial construction quality and subsequent traffic can affect a road's projected benefits and, if not included in the investment analysis, can have important implications for the actual ERR that may be equal to, or larger than, the impact of poor maintenance. The World Bank also noted that weak governance and political corruption can also have a large impact on a road's sustainability.

²⁹This simulation results in a modest impact on ERR because it reflects both a reduction in future benefits and a reduction in future costs for road maintenance.

³⁰In technical comments on a draft of this report, the World Bank noted that it measures induced benefits directly, comparing base traffic levels with expected growth in demand for transport as a result of investments. This method results in relatively straightforward and transparent calculations. The World Bank observed that models using other, more indirect approaches to estimating traffic, such as examining the impact of increased agricultural production, require careful consideration and that it has generally used such methods less often over the last 10 years because the results are sometimes unclear and sensitive to assumptions. Typically, it uses such methods only when a road project is expected to have significant restructuring effects—such as a completely new road or bridge in an urban environment—that could drastically change land use patterns.

is assumed to transform an area's agricultural production, it is easy to show large benefits and high ERR.³¹

Limited response to the compact by tourism providers and agricultural producers would have a significant impact on compact benefits. For example, our analysis shows that the phasing of costs and benefits reduces the overall compact ERR from 24.2 percent to 16.5 percent, and the omission of induced benefits (i.e., no producer response) further reduces the compact ERR to 5.5 percent. Two projects would have a negative ERR.

Efficiency Gains May Not Cause Measurable Change in Per Capita Income

MCC counts efficiency gains—such as time saved because of better roads—as compact benefits. However, although efficiency gains could improve social welfare, they may not lead to changes in per capita income or GDP or be directly measurable as net additions to the economy.

Excluding efficiency gains from ERR calculations reduces the compact's overall ERR. For example, our analysis shows that the phasing of costs and benefits and the omission of efficiency gains from the Vanuatu ERR calculation causes the overall compact ERR to decline from 24.2 percent to 16.5 percent with phasing and to 11.8 percent without calculating efficiency gains. This analysis also results in a negative ERR for two projects (see app. V).³²

Conclusions

MCC obtained the input of knowledgeable stakeholders in projecting the benefits, costs, and number of beneficiaries of its compact with Vanuatu, which addresses one of Vanuatu's primary constraints to economic growth. However, MCC's public statements about these benefits—particularly its projection of the compact's effect on per capita income—suggest greater impacts than MCC's underlying data and analysis support. MCC's statements can be understood only by reviewing supporting source

³¹However, the lack of consideration of induced benefits is not without its flaws. World Bank officials told us that in the fast-growing economy of Vietnam, the World Bank funded a road on the basis of current use of traffic without projecting the gains to the economy. The road is now very congested, and the project was underinvested. According to the World Bank, consideration of projected traffic increases—that is, induced traffic—are taken into account only when the project is not justified on the basis of existing traffic alone. However, rapid traffic growth is considered exceptional.

³²The ERR in this case does not take into account opportunity costs and is therefore an internal rate of return.

documents and spreadsheets, which are not publicly available. These gaps could lead to unrealistic expectations about the compact's effect within Vanuatu; for example, by suggesting that per capita incomes will increase so quickly, MCC suggests that its compact will achieve sustainable growth in a way that other donors to Vanuatu have not been able to achieve. Further, these gaps between MCC's statements and underlying analysis raise questions about other compacts' projections of transformative impact on country economies or economic sectors. Without an accurate representation of the compacts' projected benefits, the extent to which the compacts further MCC's goals of poverty reduction, economic growth, and transformative development cannot be accurately evaluated. Further, MCC's economic analyses for the Vanuatu compact did not fully consider the phasing of costs and benefits, such as the time required to improve the infrastructure and for the economy to respond to the opportunities from the improved infrastructure. Additionally, MCC's analysis did not fully account for risks that could substantially reduce compact benefits.

Recommendations

We recommend that the CEO of MCC take the following actions:

- revise the public reporting of the Vanuatu compact's projected impact to clearly represent the underlying data and analysis;
- assess whether similar statements in other compacts accurately reflect the underlying data and analysis; and
- improve economic analysis by phasing the costs and benefits in compact ERR calculations and by more fully accounting for risks such as those related to continuing maintenance, induced benefits, and monetized efficiency gains as part of sensitivity analysis.

Agency Comments and Our Evaluation

MCC provided written comments regarding a draft of this report. We have reprinted MCC's comments, with our responses, in appendix VI and incorporated technical comments from MCC where appropriate. Although MCC did not directly acknowledge our recommendations, it questioned our finding of a gap between its portrayal of the compact's benefits and its underlying analysis. In addition, MCC responded to our discussion of beneficiary numbers and program risks. Following is a summary of MCC's comments and our evaluation of these comments.

Compact Impact on Incomes and Growth

MCC acknowledged that its use of projected cumulative compact impact on income and growth was misleading, but it asserted that (1) it had no intention to mislead and (2) its portrayal of projected compact benefits was factually correct and consistent with its underlying data. Our report does not state or imply that MCC intended to mislead; we have not determined why MCC made its statements portraying projected benefits on income and growth. Further, MCC's portrayal of the projected benefits could be considered factually correct and consistent with the underlying data only if the reader knows that the portrayal represents cumulative income and growth over 5 years. However, MCC's public documents and communications to Congress never describe the benefits it projects as being cumulative over 5 years. At issue in this finding are both the facts represented by MCC's data and calculations and MCC's representation of these data and calculations in its public statements. As our report notes, MCC's statements can be understood accurately only by reviewing supporting source documents and spreadsheets, which are not publicly available.

In addition, MCC's portrayal of the compact's effect in cumulative terms is not consistent with its description of per capita income in Vanuatu in annex I of the compact, which states that per capita income in Vanuatu declined by 15.4 percent between 1994 and 2003. This calculation is consistent with the World Bank's data, which show Vanuatu's per capita income in 2003 as approximately 15.4 percent less than its per capita income in 1994—a comparison of 2003 and 1994 income levels, not a reflection of cumulative decline. If the methodology MCC uses to describe past per capita income in Vanuatu is used to describe the compact's projected future impact, then the projected increase in Vanuatu's per capita income in 2010 should be portrayed as 3.9 percent, not the cumulative 15 percent that MCC presents in its congressional notifications and public documents.

MCC also commented that its data on the compact's effect on Vanuatu's GDP are consistent with its assessment that GDP will be perpetually 3 percent higher with the MCC investment than without it. We agree that MCC's data reflect this, but MCC's portrayal of this benefit in its public statements implies an effect on the growth rate, rather than the level, of Vanuatu's GDP. MCC couples its portrayal of the GDP benefit with a description of the compact's impact as "transformational"—that is, as MCC defines the term, having "a dramatic and long-lasting impact on poverty reduction through sustainable economic growth." However, although MCC's data show projected benefits to Vanuatu's economy, including an increase in the level of GDP, the projected change to the

overall Vanuatu economy, as reflected by the GDP growth rate, is smaller than 3 percent. In 2010-2015, for example, the GDP growth rate increase resulting from the compact will be 0.1 percent.

Compact Beneficiaries

MCC commented that our report suggests that (1) nonpoor households could feasibly be excluded from the count of beneficiaries, (2) persons living on off-shore islets and in the hinterland should not be counted as beneficiaries, and (3) MCC's definition of the local beneficiary population includes urban dwellers. Regarding nonpoor households, we do not suggest that they could be excluded or that this would be desirable. Our report indicates that MCC's analysis shows there will be poor, rural beneficiaries as well as other beneficiaries and that MCC has not quantified what portion of the compact's benefits poor, rural beneficiaries will receive. Regarding off-shore and hinterland beneficiaries, we do question whether inhabitants of off-shore islets and of villages more than 10 kilometers from MCC projects on Santo and Efate would benefit fully from MCC's projects. However, these persons are less than half of the total number we question. In Santo and Efate, 51 percent of the catchment area population are not inhabitants of the hinterland or off-shore islets, but rather residents of Efate, near the tourism center and capital of Port Vila and along a portion of the Ring Road that is already paved. It is not clear how construction of a road elsewhere on the island will benefit these residents when they already have access to Port Vila via the existing paved road. Regarding the definition of "local population"—which MCC's underlying documentation says will receive 43 percent of compact benefits—MCC's written comments asserted that its definition of this population does not include urban dwellers. Although we asked MCC to support this assertion, MCC did not provide any additional documents. In separate comments, MCC added that although its documentation does not contain a very detailed reference specifically saying exactly how many business people, transport providers and tourism operators are foreigners and urban, MCC believes it reasonable to conclude that urban dwellers are included in these categories. However, we note that not every urban dweller is a business person, transport provider, or tourism operator and that some urban beneficiaries would therefore fall into the "local population" that receives an estimated 43 percent of benefits. Further, MCC's definition of the term in its internal documents includes persons who are not poor and not rural.

Program Risks

MCC commented that it undertakes sensitivity analysis for all of its ERR calculations, although it may focus on risks other than those we identified.

In addition, MCC states that it differs significantly from us regarding the precise nature and severity of program risks in general. As our report notes, we offer several alternative scenarios to illustrate the maximum impact of certain areas of risk on projected compact benefits. The scenarios look at the effect of individual risk areas, rather than the possibility of projects' failing to achieve certain benefits in multiple areas simultaneously. Regarding induced benefits and efficiency gains, we note that MCC's documentation of its economic analysis questions the valuing of efficiency gains as induced benefits to the Vanuatu economy. Regarding maintenance, MCC states that its compact provides a significant amount of money to assist the Vanuatu PWD in providing timely and adequate maintenance. However, as our report notes, Vanuatu's record of maintenance is poor, and achieving a change in maintenance performance through donor assistance would show a significant break from past experience. Finally, regarding contingencies, MCC questions our use of the Flyvbjerg, Holm, and Buhl study as a basis for evaluating its use of contingencies and states that it provided us with price and contingency information to support its use of contingencies. The Flyvbjerg, Holm, and Buhl study and our report use the same basis of comparison for evaluating the adequacy of contingencies, and we have updated the language of our report to make this clear. In addition, as our report notes, we did not receive full documentation of the cost estimates and contingencies that MCC used in developing its economic analyses. We received no supporting documentation for the cost and contingency estimates for the Santo and Efate projects, which account for 56 percent of the total compact budget. A key document that MCC's contractor said it used as a basis for developing the Santo and Efate costs was unavailable to us, because the government of Vanuatu would not provide it to MCC. Cost overruns remain a risk to project benefits, and we have presented them as such.

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies of this report to interested congressional committees as well as to the CEO of MCC and the Secretary of the Treasury. We will make copies available to others on request. In addition, this report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact David Gootnick at (202) 512-3149 or gootnickd@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix VII.

Sincerely yours,

A handwritten signature in black ink, appearing to read "David Gootnick". The signature is stylized with a large initial "D" and a cursive "Gootnick".

David Gootnick
Director
International Affairs and Trade

Appendix I: Objectives, Scope, and Methodology

At the request of the Chairman of the House Committee on Foreign Affairs, we examined the Millennium Challenge Corporation's (MCC) economic analyses of the Vanuatu compact. Specifically, we examined

- MCC's methods of projecting the compact's economic benefits and methods of calculating the benefits,
- MCC's portrayal and analysis of the projected benefits, and
- risks that could affect the compact's impact on poverty reduction and economic growth.

To accomplish our objectives, we reviewed MCC's record of due diligence, including its opportunity memo, investment memo, due diligence book, economic analysis spreadsheets, and contractor reports. These documents are restricted from public dissemination based on MCC policy, but MCC made them available to us for analysis. We also reviewed the supporting documents used in MCC's due diligence process, such as previous donor reports and studies. We supplemented this review with interviews with MCC officials in Washington, D.C., and MCA-Vanuatu officials in Vanuatu. We then used this information to (1) summarize the process that MCC used to develop its economic model and (2) identify the logic, data, methods, and assumptions used to determine the compact's projected costs and benefits, number of beneficiaries, and effects on per capita income, gross domestic product (GDP), and poverty.

We evaluated MCC's statements of compact impact in its public documents such as the congressional notification and the compact itself—as well as MCC's internal investment memo—by comparing these statements with the underlying analyses and data used to support them. We analyzed the November 2005 investment memo spreadsheet containing the source data and calculations used for MCC's statements about per capita income and GDP and reviewed its contents and formulas to determine the methodology and source data for MCC's statements and to assess the accuracy of the calculations. We then used MCC's own data and formulas from the November 2005 investment memo to determine MCC's impact in individual years and compare the results with the statements made in the Vanuatu compact and congressional notification. We could not validate most of MCC's underlying data and assumptions, because some data, such as construction and maintenance cost data, were not available or could not be checked within the time frames of our engagement. Further, we used the calculations and formulas from MCC's November 2005 investment memo, corrected population figures, and the

data from MCC's April 2006 final economic analysis to recalculate MCC's statements about per capita income impacts. We reviewed MCC's economic analysis spreadsheet to find the amount of benefits that MCC's analysis assumed would flow to poor, rural beneficiaries and reviewed spreadsheets provided by MCA-Vanuatu to determine the assumptions, methodology and data used to calculate the beneficiary population in Santo and Efate. We compared the spreadsheet data with Vanuatu village maps and population figures from the 1999 National Population and Housing Census provided by MCA-Vanuatu to evaluate MCC's calculations and assumptions about the villages included as beneficiaries.

We identified risks to MCC's compact results based on our review of MCC's internal documentation and donor and academic literature. We also met with Vanuatu, MCC, and contractor officials and interested parties such as tourism and agriculture business owners in Vanuatu. We focused our field work on the three projects representing more than half of the compact budget and on Vanuatu's two most populous islands, Santo and Efate. We examined MCC's due diligence documentation and contacted MCC's contractor to determine the methodology used to estimate construction costs. We then compared MCC's procedures to findings and GAO's best practice criteria for cost estimation. We compared MCC's assumptions about maintenance continuing for 20 years to previous donor experiences gleaned from donor reporting or interviews with the Asian Development Bank, Australian Agency for International Development, European Union, International Monetary Fund, New Zealand Agency for International Development, and World Bank. We determined the need for the phasing of benefits based on discussions with knowledgeable agriculture and tourism representatives in Vanuatu and a review of MCC's source documentation. We further compared MCC's treatment of induced benefits to the approach taken by the World Bank and MCC's treatment of direct benefits to economic principles about the monetization of efficiency gains. We modeled risk scenarios that provide alternative methods of looking at compact benefits using MCC's April 2006 economic model spreadsheet. In modeling these risks, we used the data from MCC's economic analyses; we did not validate these data. In these scenarios, we determined the effect of the scenario on the economic rate of return by assuming the phasing in of costs over 3 years and of benefits over 5 years, first determining the effect of phasing alone, then examining the phasing of costs and benefits coupled with the following:

- Lack of maintenance—eliminating all future large maintenance expenditures and taking away a fraction of the growing expected benefits

each year, so that at the end of the 20-year period, 2027, benefits basically return to their 2012 level.

- Lack of induced benefits—deleting those benefits from the cost model.
- Lack of monetized efficiency gains—deleting those benefits from the cost model.

Appendix II: Prior Development Assistance to Vanuatu

Of Pacific island countries, Vanuatu receives among the largest amounts of aid; however, Vanuatu's economic performance and social development since 1990 have lagged behind other countries in the region. Vanuatu depends on donor assistance for its development budget; from its gaining independence, in 1980, to 2002, aid receipts averaged around 17 percent of GDP. In 1997, Vanuatu initiated structural adjustment efforts with ADB assistance designed to stimulate the private sector and help realize the country's growth potential in agriculture and tourism. However, these reforms have had a limited impact on growth in private-sector investment and GDP. In 2003, the government of Vanuatu prepared the Priorities and Action Agenda to focus available resources, including donor assistance, on Vanuatu's development priorities. The current strategies of Vanuatu's major donors—which include Australia, France, New Zealand, the European Union, Japan, and MCC—are aimed at strengthening Vanuatu's productive sectors and supporting private sector-led development and are based on the Vanuatu government's stated goals. MCC anticipates that its average annual assistance level of \$13.1 million over the next 5 years will position the United States as one of Vanuatu's top two official donors (see table 1).

Table 1: Average Annual Contributions of Top Five Donors to Vanuatu in 2004 and 2005

(Dollars in millions)	
Donor	Average annual contribution
Australia	\$19.1
France	\$5.3
New Zealand	\$4.8
European Union	\$4.6
Japan	\$3.5

Source: Organization for Economic Cooperation and Development.

According to the ADB, Vanuatu's development budget has concentrated on building new capital infrastructure; however, according to donor reporting, these assets have not been adequately maintained. From 1996 to 2004, Vanuatu received about \$35 million in assistance for transportation infrastructure projects including the construction and rehabilitation of roads, bridges, and wharfs, and the extension and upgrading of airport terminals and runways.

According to studies by the World Bank and ADB, Vanuatu faces significant development challenges. Some of Vanuatu's challenges are

shared by other small states and island economies,¹ while others are either the result of, or exacerbated by, political instability and, according to ADB, inappropriate policies or regulations. Like other small island economies, Vanuatu's agriculture and tourism sectors are sensitive to extreme weather conditions and natural disasters. For example, frequent cyclones cause production shocks and restrict the range of viable crops and tree species. Vanuatu's narrow production base also leaves the economy open to economic shocks from changes in commodity prices, especially for copra. Despite these constraints, Vanuatu has a wealth of natural resources and growth opportunities in agriculture, fisheries, and tourism. However, growth has been hindered by substantial barriers to private-sector development, including political uncertainty,² high costs of doing business, poor and costly infrastructure, lack of a secured transactions framework,³ and issues with land tenure.

¹According to the World Bank, some of the characteristics shared by small states such as Vanuatu include remoteness and insularity, susceptibility to natural disasters, limited institutional capacity, limited diversification, reliance on external trade, and limited access to external capital. Commonwealth Secretariat/World Bank, *Small States: Meeting Challenges in the Global Economy* (Washington, D.C.: 2000).

²Beginning in the early 1990s, Vanuatu has witnessed a series of short-lived coalition governments, comprising numerous parties and involving frequent changes of ministers. There have been eleven governments in power since 1990, with most lasting only about 1 year. This constant turnover has delayed reforms as coordination of policies and obtaining consensus for needed reforms has proved difficult. International Monetary Fund, *Vanuatu: Selected Issues*, IMF Country Report No. 07/93 (Washington, D.C.: 2007).

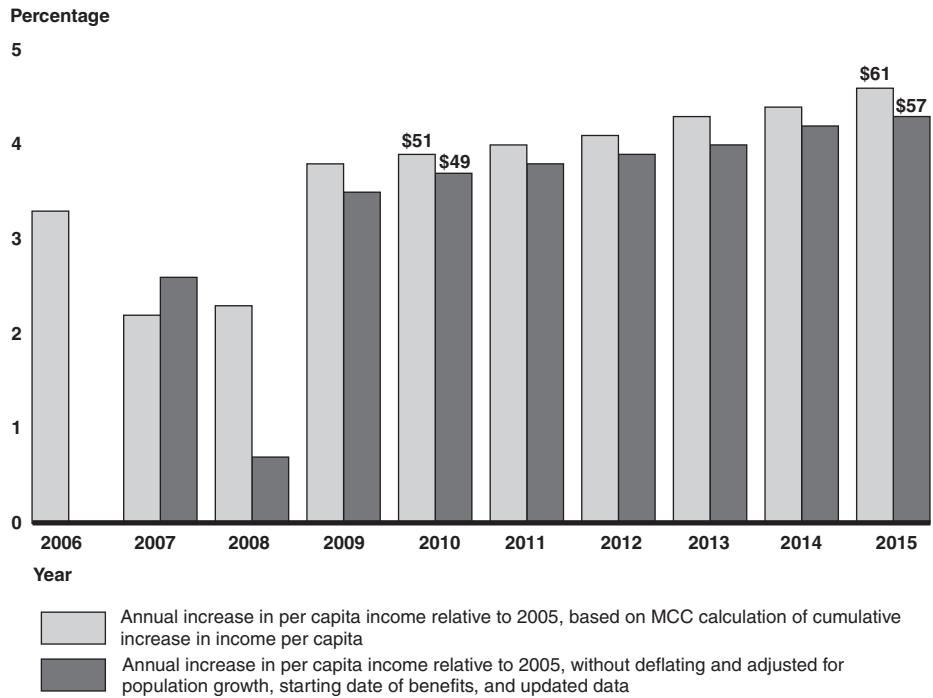
³The legal framework for secured transactions is incomplete. According to the ADB, the legal system does not allow for property to be used as collateral for loans, particularly outside of Port Vila and Luganville. Thus borrowers can neither purchase property on credit nor obtain loans against their own assets. This accounts for high borrowing costs, higher interest rates, smaller loans offered, and loans of shorter maturity, which limit the private sector's access to credit and entrepreneurship. IMF, *Vanuatu: Selected Issues*.

Appendix III: MCC Estimates of Per Capita Income Impact and Poor, Rural Beneficiaries

Per Capita Income Impact

In its economic analysis for Vanuatu, MCC did not correctly account for population growth in projecting per capita income and incorrectly deflated the value of the benefit stream that was already in real terms. When the benefit stream is no longer deflated, its value increases. However, when population growth is accounted for, the per capita income benefit is reduced. MCC assumes that the population is growing by approximately 2.6 percent each year, but MCC's analysis of cumulative income per capita benefits for 2006 to 2015 is based on 2005 population estimates, rather than on an estimate of population that increases each year. Figure 11 contrasts the estimated increase in income per capita over the 2005 baseline in the given year with and without our corrections to deflating of benefits and to population growth. The errors largely cancel out, reducing the per capita income benefit projected by MCC from \$51 (3.9 percent) to \$49 (3.7 percent) in 2010 and from \$61 (4.6 percent) to \$57 (4.3 percent) in 2015.

Figure 11: MCC Compact’s Projected Impact on Vanuatu Per Capita Income with and without Adjusted Population Estimates

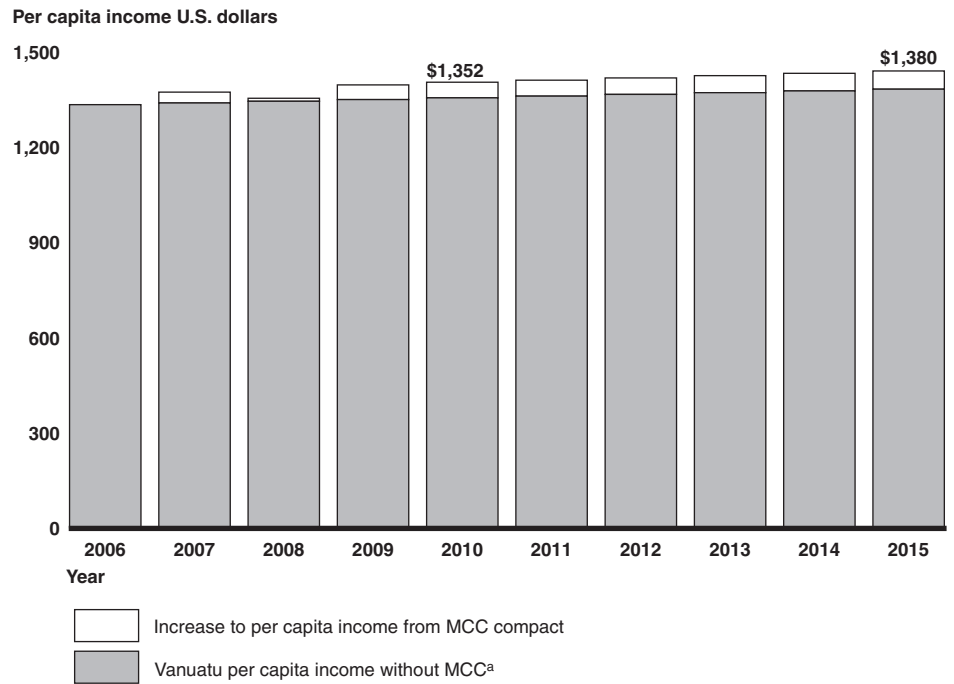


Source: GAO analysis of MCC data.

Note: In addition to adjusting for population growth and eliminating the deflating of benefits already in real terms, our revised projections of per capita income benefits use April 2006 data from MCC, including a benefit start date of 2007 for construction spending, a benefit start date of 2008 for some projects, and updated numeric values for costs and benefits.

The impact of the MCC compact on per capita income is a relatively small addition to Vanuatu’s expected per capita income without MCC. Figure 12 shows, in dollar terms, MCC’s projected impact on Vanuatu’s per capita income compared with the expected levels of per capita income, using MCC’s assumptions of 3 percent annual growth in GDP and 2.6 percent in population.

Figure 12: MCC Compact’s Projected Impact on Vanuatu Per Capita Income in Real Terms Relative to Per Capita Income without MCC



Source: GAO analysis of MCC data.

Note: Assumes 0.4 percent growth in per capita income, based on MCC’s assumed GDP growth of 3 percent without the compact and MCC’s assumed Vanuatu population growth rate of 2.6 percent.

Calculation of Beneficiaries

MCC calculated approximately 65,000 beneficiaries on the eight islands receiving MCC projects (see table 2).¹ However, MCC’s determination of beneficiary numbers in Santo and Efate contained calculation errors and relied on problematic assumptions that villages near portions of the road not improved by MCC, as well as those on off-shore islets, would fully benefit from the compact. Correcting the calculation and data errors and fully discounting MCC’s assumptions would reduce the beneficiary count on Efate and Santo by 32 percent, from MCC’s stated 26,553 to 18,070.

¹Before signing the compact, MCC determined the number of potential beneficiaries but did not quantify targets for the compact’s effect on poverty. MCC has funded an additional survey that will provide updated baselines and the basis for establishing these targets.

Table 2: Number of Poor, Rural Beneficiaries of Vanuatu Compact, as Calculated by MCC

Island	Project	Number of beneficiaries
Efate	Round Island Road	13,819
Santo	Port Olry Road	7,404
Santo	South Coast Road Bridges	5,330
Subtotal, Santo and Efate		26,553
Other projects		
Tanna	Whitesands Road	6,190
Malekula	Lits Lits Road	5,676
Malekula	Southwest Bay Airstrip	4,570
Pentecost	Loltong Wharf and North-South Road	7,858
Epi	Lamen Bay Wharf	1,560
Malo	Malo Roads Upgrading	3,480
Ambae	Ambae Roads Reconstruction	9,340
Total		65,227

Source: GAO analysis of MCC data.

Our examination of the calculation of MCC’s beneficiary estimate for the Efate Ring Road, Santo East Coast Road, and Santo South Coast Road Bridges shows that MCC’s estimate of rural beneficiaries in Santo and Efate would be increased by approximately 5,100 persons, or 19 percent, if adjustments were made to correct data errors² (see table 3).

²We identified the following errors: (1) MCC’s beneficiary estimates use data from the 1999 census and have not been updated to 2005. This results in an underestimate of the beneficiary population. (2) In the data provided to us, the total of the populations of villages included in the MCC analysis does not match the beneficiary count in the monitoring and evaluation plan. (3) For the Efate Ring Road project, MCC’s data double-counted some villages. (4) For all three projects, the 1999 population figures used for some villages do not match the populations shown in the 1999 Vanuatu census. For the Santo East Coast Road, the population figures do not match for 53 of 56 villages in the catchment area.

**Appendix III: MCC Estimates of Per Capita
Income Impact and Poor, Rural Beneficiaries**

Table 3: Effect of Calculation and Data Errors on Beneficiary Population in Efate and Santo

	Efate Ring Road	Santo East Coast Road	Santo South Coast Road Bridges	Total
MCC Statement: beneficiary count in monitoring and evaluation plan	13,819	7,404	5,330	26,553
GAO recalculation of MCC data ^a	15,439	7,518	8,732	31,689
Difference	1,620	114	3,402	5,136

Source: GAO analysis of MCC data.

^aGAO's recalculation uses 1999 Vanuatu census data, removes double-counted villages, and updates the population to 2005 using MCC's assumed population growth factor in rural areas of 2 percent per year.

MCC also made problematic assumptions about the geographic reach of project benefits that increased the number of beneficiaries by including more rural areas as benefiting from the project. Fully discounting these assumptions would reduce the beneficiary count from our adjusted total of 31,689 to 18,070 (see table 4).

Table 4: Effect of MCC Assumptions on Beneficiary Population in Efate and Santo

	Efate Ring Road	Santo East Coast Road	Santo South Coast Road Bridges	Total
GAO calculation using MCC data	15,439	7,518	8,732	31,689
Discounting population of areas not adjacent to MCC road project	(6,889)	0	(3,222)	(10,111)
Discounting population of off-shore islets	(2,779)	(196)	(533)	(3,508)
Total^a	5,770	7,322	4,978	18,070

Source: GAO analysis of MCC data.

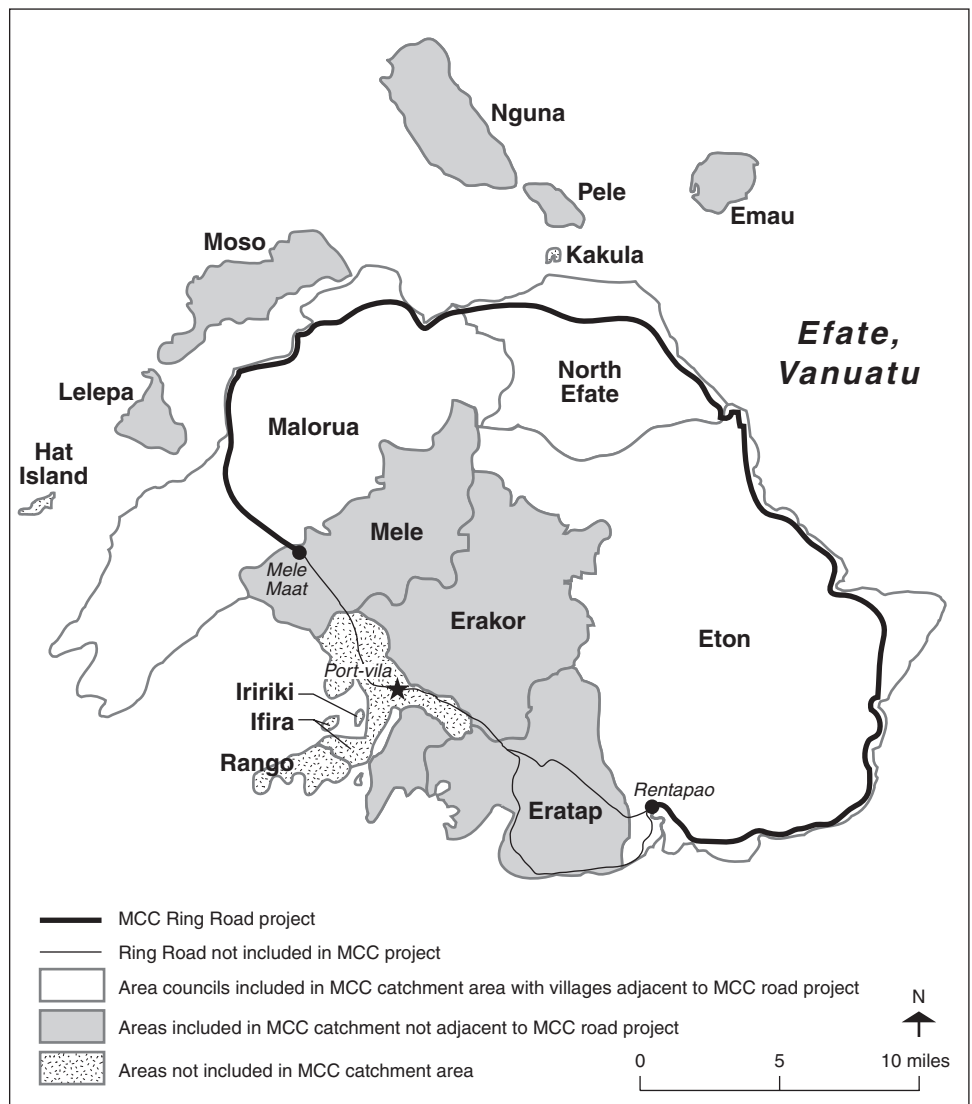
^aBecause of rounding, numbers in columns may not sum to totals.

In estimating beneficiaries of both the Efate Ring Road and the Santo South Coast Road Bridges projects, MCC included the populations of villages not located near MCC's road projects and populations that face geographic barriers to using the projects. These population counts were not prorated or adjusted to account for the barriers that some villages face in realizing benefits from MCC's projects.

- In Efate, MCC assumed that the populations of villages located along an already improved portion of the road adjacent to Port Vila in the Mele, Eratap, and Erakor areas—which will not be addressed by the MCC compact—would benefit from construction of the road elsewhere on the island (see fig. 13). MCA-Vanuatu stated that the populations of these

villages were included because they own land where the road will be constructed and most of the villagers' gardens are located in these areas. (The source for this assumption is not documented.) The inhabitants of these villages represent 45 percent of the total number (15,439) of poor, rural Efate beneficiaries. MCC also did not account for "most" villagers and instead included the entire village population in these areas in its totals.

Figure 13: MCC Efate Ring Road Catchment Area



Sources: GAO based on MCC data; Vanuatu government (map).

- For the Santo South Coast Road Bridges, MCC included villages in West Santo more than 10 kilometers from the bridge projects and villages across a river that vehicles can cross only by fording; after heavy rains, the river becomes impassable. MCC's compact program does not include a bridge across this river. Using a 2005 population estimate, we determined that MCC included 3,222 people in the count of beneficiaries of South Coast Road Bridges based on this assumption—37 percent of the total number (8,732) of South Coast Road Bridges beneficiaries.

For all three projects, MCC assumed that inhabitants of off-shore islets would fully benefit, although they are not connected to the improved roads and must travel by boat to reach them. MCC officials told us that they expect that residents of off-shore islets will benefit from increased tourism spending after construction of roads and would benefit from decreased transportation costs after coming to the mainland. Using 2005 population estimates, we determined that 2,779 persons (18 percent of the Efate Ring Road beneficiary population) live on off-shore islets. For the Santo East Coast Road and South Coast Road Bridges, respectively, 196 (3 percent of the beneficiary population) and 533 (6 percent of the beneficiary population) live on off-shore islets.

Appendix IV: MCC Cost Estimates for the Vanuatu Compact

The reliability of MCC's cost estimates for the Vanuatu compact construction cannot be evaluated, because MCC was unable to fully provide the data that it used to produce them. MCC's contractor based its construction cost estimates for MCC's transportation infrastructure activities primarily on two sources. To build cost estimates for seven of the compact projects, representing 15 percent of total compact cost, the contractor used a 2003 analysis it had performed for the ADB. To prepare cost estimates for the three projects on Santo and Efate, representing 56 percent of compact cost, the contractor used estimates prepared by a second contractor for the government of Vanuatu.¹

- For the seven ADB projects, MCC's file of documents used in its due diligence included the original cost estimate but did not include an analysis that showed how these costs were updated to account for inflation and changes in the scope of the work. MCC's documentation states that these previous costs were multiplied by 1.17 to account for inflation and also adjusted for changes in the scope.²
- For the three projects on Santo and Efate, MCC's file did not include any source information or analysis. MCC's contractor later told us that it derived the costs of the projects on Santo and Efate from an existing report by a second contractor to the government of Vanuatu, dated approximately 2004. MCC's contractor told us that because MCC's scope of work was more realistic than that proposed in 2004, which included realigning portions of the roadways, the MCC cost estimate was prepared anew using source information from the previous report. We requested, but did not receive, a copy of this report to the government of Vanuatu and a copy of the analysis showing how MCC developed its cost estimates using this source data. According to MCC officials, the government of Vanuatu was not willing to provide the report to MCC for our review.

According to previous GAO work, high-quality, reliable cost estimates should be accurate, comprehensive, well-documented, and validated.³

¹The remaining 29 percent of costs are for warehouses, and for oversight and administrative functions.

²MCC's contractor provided us with spreadsheet calculations of the costs for five of the compact projects for MCC. The sheets included estimated quantities and unit costs but did not indicate how these quantities and costs were derived.

³We developed these criteria as part of a forthcoming publication on best practices in cost estimation and implemented the criteria in a recent report. See GAO, *Telecommunications: GSA Has Accumulated Adequate Funding for Transition to New Contracts but Needs Cost Estimation Policy*, [GAO-07-268](#) (Washington, D.C.: February 23, 2007).

MCC cost estimates used in the economic analyses have shortcomings in each of these areas.

- *Accurate.* The source data for the estimates is from 2003 and approximately 2004, and changes in the cost environment beyond general inflation may not be accounted for. MCC also incorrectly calculated the length of the Santo East Coast Road as 70 kilometers in its economic analyses, instead of the 55 kilometers found by a PWD survey, according to a PWD official. Other elements of this criterion cannot be independently assessed without the source data for the cost estimates used in the model.
- *Comprehensive.* We could not assess the cost estimates against this criterion without the source data for the estimates used in the model.
- *Well-documented.* MCC did not fully document any cost estimation procedures and checks that it performed as part of its due diligence. The due diligence documents we received from MCC contain a narrative describing the cost estimate procedures, but no documentation showing the analysis that MCC's contractor performed to update previous cost estimates.
- *Validated.* MCC's due diligence documentation contains no evidence that it obtained an independent cost estimate to verify the work of its contractor in updating its own estimate for the ADB projects and reworking the estimates of another contractor for the Efate and Santo projects. An independent cost estimate provides the estimator with an unbiased test of the reasonableness of the estimate and reduces the cost risk associated with the project by demonstrating that alternate methods generate similar results.

Appendix V: Illustrative Alternative Calculations of Vanuatu Compact Impact

This appendix describes the results from several alternative scenarios, which disaggregate the effects of the various types of benefits on the overall ERR, GDP and per capita income in order to illustrate the significance of each of the components.

MCC reported different values of summary statistics in the investment memo dated November 2005 as compared with the final analysis that reported more recent data (see table 5).

Table 5: Summary of Compact Impacts as Presented by MCC, with GAO Recalculations

	Compact ERR	Increase in level of GDP with MCC in year 5 vs. GDP without MCC in year 5	Increase in level of real income per capita in 2010 vs. 2005 baseline
MCC's anticipated effect as presented in investment memo	24.7 percent	3.2 percent	3.9 percent ^a
MCC's anticipated effect using corrected or updated data	24.2 percent ^b	3.2 percent	3.7 percent ^c

Source: GAO analysis of MCC data.

^aDerived from MCC's own data and calculations.

^bIn its updated and final April 2006 economic analysis, MCC adjusted the 24.7 percent reported in its congressional notification downward slightly to 24.2 percent.

^cGAO calculation after correcting MCC calculation errors.

To illustrate the maximum impact of certain areas of risk on projected compact benefits, we modified the model using MCC data for different scenarios. We phased costs and benefits to mirror more accurately the rate of construction and accrual of potential benefits. Phasing costs has the effect of increasing ERR, while phasing benefits decreases it; the net effect is to decrease ERR. Within this modified framework that includes phasing, we eliminated each main type of benefit—direct and induced—one at a time to understand their relative importance.

- For “no induced benefits,” we eliminated all induced benefits from expanded tourism, agriculture, or land development as a result of the compact but did not change the direct benefits.
- For “efficiency gains are not monetized,” we eliminated all direct benefits such as cost savings for existing users of a road or benefits from newly generated traffic, which are attributable to the project, but did not change the induced benefits.

Finally, we examined the impact of poor maintenance performance after compact expiration in 2011 on total benefits from the phased project. We modeled this by eliminating all future large maintenance expenditures and taking away a fraction of the growing expected benefits each year, so that at the end of the 20-year period, 2027, benefits basically return to their 2012 level.

These scenarios present illustrative cases and should be considered as extremes of a possible range of cases that capture uncertainty effects on summary statistics, such as the ERR, GDP, and income per capita. MCC has observed that overall benefits may understate the true impact of the compact because spillover effects, such as easier access to schools and medical facilities due to the improved infrastructure, are not captured by these measures. These effects represent long-term benefits to society as whole, which are not accounted for by the analysis performed by either MCC or GAO.

Table 6: Summary of Compact ERR, GDP, and Per Capita Income impacts under Alternative Scenarios of Accounting for Risks to Benefits

GAO analysis ^a	Compact ERR	Increase in GDP with MCC in year 5 relative to GDP without MCC in year 5	Increase in real income per capita level in year 5 relative to 2005 baseline
(1) Costs are phased over 3 years and benefits are phased over 5 years	16.5 percent	1.1 percent	1.4 percent
Costs are phased over 3 years and benefits are phased over 5 years, and			
(2) induced benefits are not realized ^b	5.5 percent	0.7 percent	0.8 percent
(3) efficiency gains are not monetized ^c	11.8 percent	0.8 percent	1.0 percent
(4) large-scale maintenance is not undertaken ^d	13.8 percent	1.1 percent	1.3 percent

Source: GAO analysis of MCC data.

^aIn our analysis, benefits start in 2010 and are phased in equal increments over 5 years, from 2010 to 2014, with phasing completed by year 5. Costs are phased over 3 years to reflect projected timing of construction.

^bIn addition to phasing benefits and costs, we eliminated induced effects of the project on agriculture, tourism, fisheries, and the development of subdivided beachfront land.

^cIn addition to phasing benefits and costs, we eliminated road user cost savings and savings from wasted surface trips, lost trips, longer diversions, and enforced longer trips from road closures.

^dIn addition to phasing benefits and costs, we assumed that total benefits will increase, peak, and decrease such that their value in 2027 will equal their original value in 2012. The large capital outlays for road rehabilitation in 2017 and 2026 in Santo and Efate have been eliminated.

**Appendix V: Illustrative Alternative
Calculations of Vanuatu Compact Impact**

Table 7 reports the ERR for individual projects as modified in our scenarios.

Table 7: Summary of Selected Compact Project Impacts under Alternative Scenarios Accounting for Risks to Benefits

Projects	MCC's anticipated ERR	Costs are phased over 3 years and benefits are phased over 5 years	Costs are phased over 3 years, benefits are phased over 5 years, and		
			Induced benefits are not realized	Efficiency gains are not monetized	Large-scale maintenance is not undertaken
Overall compact	24.2 percent	16.5 percent	5.5 percent	11.8 percent	13.8 percent
Efate: Ring Road	20.6 percent	13.6 percent	negative	10.8 percent	11.2 percent
Santo: Port Olry Road	33.8 percent	22.6 percent	10.3 percent	15.5 percent	19.4 percent
Santo: South Coast Bridges	24.3 percent	14.3 percent	-4.0 percent	12.4 percent	10.8 percent
Tanna: Whitesands Road	17.7 percent	12.1 percent	8.6 percent	-0.3 percent	8.4 percent
Malekula: Lits Lits Road	22.5 percent	15.1 percent	15.1 percent	negative	14.3 percent
Malekula: South West Bay Airstrip	11.4 percent	6.3 percent	1.1 percent	6.1 percent	2.4 percent
Pentecost: Lolong Wharf/N-S Road	15.6 percent	8.9 percent	5.6 percent	4.4 percent	4.7 percent

Source: GAO analysis of MCC data.

Appendix VI: Comments from the Millennium Challenge Corporation

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



MILLENNIUM
CHALLENGE
CORPORATION
EFFECTIVE POWER. EQUITABLE GROWTH.

June 8, 2007

Mr. David B. Gootnick, Director
International Affairs and Trade
Government Accountability Office
441 G Street NW
Washington, DC 20548

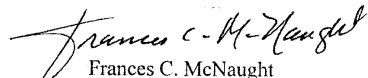
Dear Mr. Gootnick:

We appreciate the opportunity to review and comment on your draft report, "Vanuatu Compact Overstates Projected Program Impact."

The enclosed Millennium Challenge Corporation views are provided for incorporation with this letter as an appendix to the final report.

If you have any questions concerning this response, please contact Rick Stilgenbauer, Program Officer, Department of Congressional and Public Affairs, at (202) 521-3629.

Sincerely,


Frances C. McNaught
Vice President
Congressional and Public Affairs

Millennium Challenge Corporation Comments on GAO Draft Report

Vanuatu Compact Overstates Projected Program Impact

General

The Millennium Challenge Corporation (MCC) thanks the Government Accountability Office (GAO) for their dedication and care in producing this audit of the MCC Compact with Vanuatu, and in particular their investment of time and resources to see conditions on the ground firsthand. We are pleased with the many opportunities that we had for frank and open exchanges of views with GAO staff, in a spirit of mutual cooperation. MCC maintains that the Vanuatu Compact will benefit significantly the county's poorest people and positively transform the economy.

At issue between the GAO and the MCC is the degree of benefit. The language in the MCC Compact reads: *"The Transport Infrastructure Project is expected to have a transformational impact on Vanuatu's economic development, increasing average income per capita (in real terms) by approximately \$200 or 15% of current income per capita by 2010."*

The GAO report states: *"This statement suggests that per capita income in 2010 and 2015 will be, respectively, 15 percent and 37 percent higher than they would be without the compact; however, MCC's data and calculations show that this projected impact on per capital income is cumulative, rather than annual, relative to 2005 per capita income."* (page 3, GAO draft report)

In short, the GAO report asserts that the MCC statement "suggests" a larger increase in annual income while the underlying data show that it is a cumulative increase. This suggestion then becomes the basis for the headline of the report which is repeated multiple times throughout the body of the GAO report.

We understand the basis for the GAO assertion, although we have emphasized repeatedly in discussions with GAO staff that the key statements in question were factually correct, and that it was in no way our intention to overstate benefits. That said, in all future MCC reports, we will use wording that cannot be subject to the misinterpretation that the GAO attributes to MCC in this case. MCC notes that the GAO presentation of its own assertion, in word and graphics, is itself likely to mislead readers.

Compact impact on incomes and growth

The summary page presents a graphic entitled, "Comparison of MCC Vanuatu Compact Per Capita Income Effect Stated in Congressional Notification to Effect Supported by Underlying Data." The caption in the legend of this diagram incorrectly suggests that MCC erred factually in describing the cumulative benefits of the program after five years. Specifically, MCC stated that per capita income would increase by a cumulative amount of 15.4% by 2010 relative to the 2005 baseline. This is, in fact, how MCC understood the underlying data in 2005. However, the GAO includes an additional figure in the graphic with the caption, "MCC's underlying data," that would lead a reasonable reader to believe that the cumulative growth over these five years would be only 3.9%. The underlying data do not support the conclusion that cumulative growth over five years would be only 3.9%. MCC accepts the GAO's assertion that the use of five-year cumulative figures is misleading and that annualized figures

See comment 1.

See comment 2.

See comment 3.

See comment 4.

See comment 5.

See comment 6.

should be used, but we object to the characterization of the Compact figures as inconsistent with the underlying data.

See comment 7.

A second example given by the GAO, cited on page three, faults the MCC for its claim that “Vanuatu’s GDP will increase by ‘an additional three percent a year.’” The underlying data are consistent with the assessment by MCC that Vanuatu’s GDP would be perpetually three percent higher with the MCC investment than without. The data also indicate that the effect on the per capita GDP growth rate will be moderate but rising, albeit much smaller than three percentage points. GAO interpreted the statement about three percent higher GDP as indicating that the growth rate itself would be three percentage points higher, and we take the point that a reasonable reader might make this error. We will certainly strive to reduce potential ambiguity in official language in future documentation. However, we maintain that the original language was factually correct and in no way intended to mislead.

Compact beneficiaries

See comment 8.

GAO suggests on page four that it is misleading to indicate that the Compact is “expected to benefit approximately 65,000 poor, rural inhabitants...[because] these 65,000 beneficiaries will not receive the majority of the benefits...” This suggests a significant difference between MCC and GAO. We expect that near- and non-poor households will benefit from the Compact in addition to poor households. GAO’s presentation suggests that such households (local business people, government personnel, transport providers, and tourism service providers) could feasibly be excluded and that this would be desirable. We know of no growth strategy by which this would be possible for a road project. If MCC is true to its mandate of targeting economic growth as a means of reducing poverty, it is inevitable that households above the poverty line (some not so very far above the poverty line) will also benefit significantly from MCC investments. While the 65,000 poor, rural beneficiaries cited are not the exclusive beneficiaries of the projects, they will still benefit significantly nonetheless.

See comment 9.

GAO further argues that the total number of rural beneficiaries included in MCC’s analysis should be reduced by one-third. This is based on the assumption that households living in the hinterland away from the road and also those living on islets off the coast of the main islands will not be beneficiaries. We dispute this assumption on the grounds that these individuals certainly will benefit from greater traffic along the MCC-funded roads. Households that live inland or on islets are connected to the greater economy of Vanuatu, and MCC-funded roads make those connections all the more vibrant and growth-enhancing. Naturally, those households closer to the road may benefit more in absolute terms. In counting beneficiaries, however, we have not suggested that benefits are distributed equally across beneficiaries. Variations do exist, and this is unavoidable.

See comment 10.

The GAO report also asserts on page 20 that MCC fails to identify the share of benefits that go to rural poor, of the 43% of benefits that accrue to the “local population.” MCC’s definition of “local population” does not include urban dwellers, and we have a reasonable expectation that the majority of the 65,000 are poor.

See comment 11.

Program risks - general

We appreciate the care and attention the GAO has placed on our analysis of the economic returns of MCC investments. As a means of checking the robustness of our economic analysis, GAO has

See comment 12.

integrated several risks that it believes important into a sensitivity analysis of the projected economic rates of return (ERRs). Sensitivity analysis is an important exercise that we undertake for all of our ERR calculations, although the focus may be on risks other than those identified by the GAO. While MCC accepts the concerns raised by several risks highlighted by GAO, including phasing of benefits, project start times, and sustainability, we differ significantly on the precise nature and severity of risks related to induced benefits, efficiency gains, maintenance and contingencies. MCC believes that taken as a whole the judgments that were made with respect to risks and assumptions, and the sensitivity analysis of them, were reasonable. The following discussions highlight MCC's different perceptions of risks discussed in the GAO report.

Risks - Induced benefits

See comment 13.

As GAO states on page five, "the projected induced benefits from expanded tourism and agriculture depend on businesses and rural inhabitants responding to opportunities created by improved infrastructure." GAO views the speculative nature of these induced benefits as problematic despite its own admission that "[GAO] fieldwork and meetings in Vanuatu generally affirmed MCC's assumptions about benefits." MCC aims to catalyze economic growth by providing opportunities to which beneficiaries can respond. Although we acknowledge the difficulty of assessing projected impacts of MCC investments, we feel it is important that we attempt to quantify them given our unique mandate of promoting economic growth.

Risks - Efficiency gains

See comment 14.

GAO suggests that "efficiency gains – such as time saved because of better roads – ... may not result in measurable changes in per capita income or GDP. Although efficiency gains could improve social welfare, they may not be directly measurable as net additions to the economy." While it is true that time and cost savings may not translate completely into increased income-generating activity, it is highly plausible in a poor country that the vast majority of these savings would be used to generate income. In recognition that the assumption of full translation of efficiency gains into income may overstate benefits, MCC was careful to include a scenario in which benefits are lower than expected in its sensitivity analysis of overall Compact. It is also important to note that, despite the risks identified by the GAO, other factors not included in the MCC analysis could potentially raise the returns on MCC investments (including better access to health and education, which would raise overall worker productivity).

See comment 15.

Risks – Maintenance

See comment 16.

The report makes several references to maintenance risk. We believe this risk is overstated and does not reflect a number of recent measures taken by Vanuatu over the past three years to improve its transport infrastructure maintenance capacity, nor the content of the Compact itself. For example, the Management Improvement Plan that was developed with the assistance of the Asian Development Bank has led to a significant increase in meaningful capacity within the Public Works Department (PWD) for maintenance. The European Union continues to provide assistance to expand and strengthen PWD's maintenance functions, especially in the outer islands. The Government increased the PWD's budget by an unprecedented amount, 499 million Vatu, for 2007. MCC's Compact will provide both technical assistance and a significant amount of money to alleviate one of the key constraints that prevents timely

and adequate level of maintenance by the PWD, namely maintenance equipment. These are sustainable measures, which will continue to yield benefits beyond 2011.

Risks – Contingencies

The report concludes that insufficient contingencies have been allowed in the build up of construction costs. It cites a survey by Flyvbjerg, Holm and Buhl, which concluded that road projects averaged escalations of 20.4 percent from amounts forecasted at the alternatives analysis stage. The projects that were under consideration in the Compact were at an advanced stage in preparation, either at preliminary design or final design stage, not at an alternatives analysis stage. Appropriate contingencies should be applied to project cost depending on the stage of the project. MCC has used certified civil engineers and cost estimators in reviewing and finalizing project specific costs during the due diligence phase. MCC is confident in the final cost estimates, including price and physical contingencies, for each subproject within the Compact. This information has been provided to GAO.

Conclusion

In conclusion, we wish to emphasize that our analysis excluded a range of important but difficult to quantify benefits (such as an increased ability to invest in education, healthcare, and land improvements). In this sense, our analysis was designed conservatively, to prevent the very outcome that GAO claims to have discovered in its audit, namely an explicit overstatement of benefits. While some of the language used by MCC may unintentionally mislead some readers, it would be wrong to conclude that the analysis was designed intentionally to overstate benefits, but this is the overwhelming impression a reader will get from the GAO report.

See comment 17.

See comment 18.

The following are GAO's comments on the Millennium Challenge Corporation letter dated June 8, 2007.

GAO Comments

1. MCC quotes from its statement in the compact and our statement in the text of the draft report. However, the figure we cite for per capita income in 2015—37 percent—originates in MCC's investment memo, not in our analysis.
2. MCC notes that it emphasized repeatedly that its key statements in question were factually correct and that it did not intend to overstate benefits. At issue in this finding are both the facts represented by MCC's data and calculations and MCC's representation of these data and calculations in its public statements. As our report notes, MCC's portrayal of the compact's projected impact on income and economic growth can be understood as cumulative only by reviewing supporting source documents and spreadsheets, which are not publicly available. Our report does not assert or imply that MCC's portrayal was intentionally misleading; we did not determine through our audit, or address in the report, the reasons for the gap between MCC's portrayal and its underlying analysis.
3. MCC comments that our assertion about its portrayal of income benefits is itself likely to mislead. In response to this comment, and as part of our final review process, we clarified the terms and presentation of our analysis of MCC's statements and data and made modifications as appropriate.
4. MCC asserts that it "stated that per capita income would increase by a cumulative amount of 15.4% by 2010 relative to the 2005 baseline" and that this is how it understood the underlying data in 2005. However, MCC documents in 2005 and later do not state that the portrayed effect on per capita income is cumulative. These documents include MCC's November 2005 Investment Memo; the March 2006 Vanuatu compact; the January 4 and March 7, 2006, congressional notifications; MCC press release; and the April 2007 MCC Annual Report for 2006. We asked MCC to provide any publicly available document that discloses that the per capita income effect is cumulative; however, MCC did not provide any such document.
5. MCC comments that its "underlying data do not support the conclusion that cumulative growth over 5 years would be only 3.9%." Our report does not make any assertions about the cumulative growth rate in income per capita. As stated in figure 7, we graph the increase in the

level of income per capita in each year relative to the 2005 baseline. In 2010, this increase is 3.9 percent.

6. We agree with MCC that “the use of five-year cumulative figures is misleading.” Since MCC’s public documents do not state that the increase in per capita income is cumulative, we maintain that MCC’s statements regarding the increase in average per capita income are inconsistent with its data.
7. MCC comments that “the data also indicate that the effect on the per capita GDP growth rate will be moderate but rising, albeit much smaller than three percentage points.” (We understand this statement to mean that the effect on aggregate GDP growth will be smaller than 3 percentage points, given that the sentences that follow the statement discuss aggregate, not per capita, GDP.) As the note to figure 9 of our report indicates, we agree with MCC that its data indicate that the compact will have a positive, albeit small, effect on GDP growth rate. MCC provided us with its computation showing that the compact’s effect on GDP growth rate will increase over a 20-year period and will reach 0.54 percentage points in year 20—not the 3 percent growth rate increase implied by its portrayal of the compact’s projected results. Based on MCC’s calculation, the compact will enable the Vanuatu economy to double in size in 20 years. Without the compact, the Vanuatu economy will double in size in 24 years.
8. MCC comments that “GAO’s presentation suggests that [near and non-poor] households (local business people, government personnel, transport providers, and tourism service providers) could feasibly be excluded and that this would be desirable.” We are not suggesting that such people could be feasibly excluded or that this would be desirable. Our report notes, “Given that many of MCC’s benefits flow to the expatriate-dominated tourism sector, MCC makes an appropriate assumption that the local population will not receive all the benefits.” Our report’s analysis indicates that there will be poor, rural beneficiaries in addition to other beneficiaries but observes that MCC has not quantified what portion of the compact’s benefits the poor, rural beneficiaries will receive.
9. MCC states that we argue that the total number of rural beneficiaries should be reduced by one-third. In fact, our report observes that the total number of beneficiaries may be overstated. MCC specifically disputes our observation that households living in the hinterland or on off-shore islets may not be beneficiaries. However, of the 13,619 persons in the catchment areas that we question, 6,889 (51 percent) reside not in the hinterland or off-shore islets but near the Efate

tourism center and capital of Port Vila and along a portion of the Ring Road that is already paved. Given that MCC's benefits in Efate are primarily based on increased tourist activity and road user cost savings from the improved road, it is not clear how construction of a road elsewhere on the island will lead to benefits when the existing paved road already provides access to Port Vila.

As documented in appendix III, we do question whether inhabitants of off-shore islets and of villages more than 10 kilometers from MCC projects would benefit fully from MCC's projects. MCC includes these people in its count of beneficiaries without accounting for, and quantifying, the likely decrease in benefits that will accrue to a person who lives both across an occasionally impassable river and more than 10 kilometers from an MCC project bridge. As MCC's internal analysis states regarding the Santo South Coast Road, "the project does not entail a general improvement of the road, only of river crossings. Neither would it give all-weather access all the way to Tasiriki, and so to the west coast. It must be said, therefore, that the scale of these benefits are more than usually doubtful." Elsewhere in the report, it notes that the "benefits to the west coast [Santo] population will be slight."

10. MCC asserts that its definition of "local population" does not include urban dwellers. Although we asked MCC to support this assertion, we received no additional documents. In separate comments, MCC added that although its documentation does not contain a very detailed reference specifically saying exactly how many business people, transport providers and tourism operators are foreigners and urban, MCC believes it is reasonable to conclude that urban dwellers are included in these categories. However, we note that not every urban dweller is a business person, transport provider, or tourism operator and that some urban beneficiaries would therefore fall into the "local population" that receives an estimated 43 percent of benefits.

On the basis of MCC's definitions of "local population" and other terms, we determined that "local population" includes residents of nonrural areas. MCC's definition of the term local population states, "We have combined three categories: local producers, local consumers and inhabitants of remote communities. In reality these are the same people and we have labeled them simply 'Local population.'" MCC defines local producers as including "landowners; existing and potential lessees of land; processors of primary produce, chiefly for export; and the owners and operators of tourist facilities." This definition does not distinguish between rural and urban dwellers.

Further, given that expatriates dominate in Vanuatu's formal economy sectors and that the urban center of Port Vila is the center of Vanuatu's tourist industry, it is likely that "processors of primary produce, chiefly for export; and the owners and operators of tourist facilities" include urban dwellers and those that are not poor. Finally, MCC's definition of "inhabitants of remote communities" includes the poor inhabitants of the "informal urban settlements" on the outskirts of Port Vila. Although these people come from rural areas, they are now in an urban environment and included within MCC's definition of the local population.

11. MCC states that it has "a reasonable expectation that the majority of the 65,000 [beneficiaries] are poor." However, MCC's public documents use the phrase "65,000 poor, rural inhabitants," without acknowledging that not all of the 65,000 beneficiaries live in poverty. We agree that MCC would be correct to suggest that the majority of the projected beneficiaries are poor, as our report states: "The poverty level, defined as having an income of one U.S. dollar per day, is 51 percent in rural areas."
12. About program risks in general, MCC states that it differs from us significantly regarding the precise nature and severity of risks. As we note in our report, we offer several alternative scenarios to illustrate the maximum impact of individual areas of risk on projected compact benefits. These scenarios examine the effect of individual risk areas and do not consider the possibility of projects' failing to achieve certain benefits in multiple areas simultaneously.
13. We agree with MCC that attempting to quantify induced benefits is important and that our fieldwork generally affirmed MCC's assumptions. We maintain that quantifying induced benefits constitutes a risk to projected impact, because realization of such benefits depends on beneficiaries' response to the opportunities that the compact provides.
14. We asked MCC to support its assertion that "it is highly plausible in a poor country that the vast majority of [time and cost] savings would be used to generate income." We did not receive additional documentation supporting this assertion. However, MCC stated that its assertion is based on extensive field consultations with beneficiary groups.

MCC's documentation of its methodology for assessing efficiency gains states that its valuation of the average value of passengers' time is "extremely crude." MCC's documentation adds: "The very concept of

‘working hours’ in a largely subsistence economy is open to question. And what is the value of tourists’ time to the national economy? It is arguable that faster journey times allow tourists more time to spend on things other than travel. But there is no research to support a more sophisticated approach to valuing time.”

15. MCC notes other factors that may benefit the economy. As our report indicates (see footnote 15), we agree that “other benefits may accrue to Vanuatu from the MCC compact. Increased economic activity in tourism may have spillover benefits for other sectors of the economy, and the welfare of Vanuatu’s citizens may improve due to increased access to health care and educational opportunities.”
16. MCC believes that we have overstated the risk from poor maintenance of the infrastructure investment and have not accounted for Vanuatu’s increasing its maintenance spending by \$4.6 million or the assistance and maintenance equipment MCC is providing to Vanuatu. We have added additional information to our report regarding MCC’s program to improve maintenance capability. Nevertheless, maintenance remains a significant risk. As we noted in our report, Vanuatu’s record on transport infrastructure maintenance is poor. Other donors, including officials from the ADB and the World Bank, identified maintenance as a significant challenge.
17. MCC states that “the projects that were under consideration in the compact were at an advanced stage in preparation, either at preliminary design or final design stage,” not at the alternatives analysis stage. Our previous report, which cited a study by Flyvbjerg, Holm, and Buhl as part of a larger report on improving cost and benefit analysis for transportation projects, used the term “alternatives analysis stage”; however, the study uses the term “time of decision to build” to define the point of comparison. MCC’s “time of decision to build” is when it has completed its due diligence process and decided to sign a compact. As such, the basis for comparison in the study by Flyvbjerg et al. and in our report is identical. To help clarify the basis of comparison, we have replaced “alternatives analysis stage” with “time of decision to build.”

MCC states that it provided us the final cost estimates, including price and physical contingencies, for each subproject within the compact. However, as our report notes, we did not receive full documentation of the cost estimates and contingencies that MCC used in developing its economic analyses. We received no supporting documentation for the cost and contingency estimates for the Santo and Efate projects, which

account for 56 percent of the total compact budget. A key document that MCC's contractor told us it used as a basis for developing the Santo and Efate costs was not available to us because the government of Vanuatu would not provide it to MCC. The documentation of MCC's cost estimates and contingencies for specific projects that we received shows a design contingency of 20 percent. (One project—MCC's smallest project, the \$400,000 South West Bay airstrip—adds an additional 10 percent construction contingency.) This 20 percent contingency is slightly less than the average cost overrun found by Flyvbjerg et al. MCC may complete the projects at, under, or above a 20 percent contingency. However, cost overruns remain a risk to project benefits, and we have presented them as such.

18. See comment 2.

Appendix VII: GAO Contact and Staff Acknowledgments

GAO Contact

David B. Gootnick, Director, 202-512-3149

Staff Acknowledgments

In addition to the person named above, Emil Friberg, Jr. (Assistant Director), Gergana Danailova-Trainor, Reid Lowe, Angie Nichols-Friedman, Michael Simon, and Seyda Wentworth made key contributions to this report. Also, David Dornisch, Etana Finkler, Ernie Jackson, and Tom McCool provided technical assistance.

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