



# ASSESSMENT OF THE 2015 USAID GUIDELINES FOR COST-BENEFIT AND COST-EFFECTIVENESS ANALYSIS

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# TABLE OF CONTENTS

LIST OF TABLES	III
LIST OF FIGURES	III
ACRONYMS	V
ACKNOWLEDGMENTS	VII
EXECUTIVE SUMMARY	VIII
1. INTRODUCTION AND BACKGROUND	I
2. COST-BENEFIT ANALYSIS AT USAID SINCE 2010	3
3. OBJECTIVES AND USE OF THE 2015 CBA GUIDELINES	13
4. THE DISCOUNT RATE	21
5. SOCIAL COST OF GREENHOUSE GASES	34
6. VALUATION OF ECOSYSTEM SERVICES	42
7. VALUING MORTALITY AND MORBIDITY RISKS	46
8. VALUING LABOR AND LEISURE TIME	57
9. INTEGRATING GENDER	68
ANNEX A: KII INSTRUMENTS	69
ANNEX B: DISCOUNT RATES IN 14 RECENT WORLD BANK PROJECTS	70
ANNEX C: SOW AND ASSESSMENT QUESTIONS	72
ANNEX D: SUMMARY DESCRIPTION OF SAMPLE FOR INTERVIEWS	81
ANNEX E: USAID CBA REPORTS	83
REFERENCES	87

## LIST OF TABLES

TABLE 1. COMMON BENEFITS AND LIMITATIONS OF CBA AT EACH STEP OF THE USAID PROGRAM CYCLE	6
TABLE 2: TECHNICAL COVERAGE OF VALUATION METHODS IN 2015 USAID GUIDANCE	16
TABLE 3. UNITED KINGDOM'S DECLINING DISCOUNT RATES	24
TABLE 4. DISCOUNT RATE POLICY AND PRACTICE AT FOUR USG AGENCIES	26
TABLE 5. DISCOUNT RATE POLICY AND PRACTICE AT FOUR MULTILATERAL DEVELOPMENT BANKS AND THE EUROPEAN COMMISSION	26
TABLE 6. ADVANTAGES AND DISADVANTAGES OF THREE ALTERNATIVE PERSPECTIVES ON ECONOMIC DISCOUNT RATES	30
TABLE 7. ADVANTAGES AND DISADVANTAGES OF OPTIONS FOR VALUING LONG-TERM BENEFITS AND COSTS	32
TABLE 8. VSLs USED BY OTHER ORGANIZATIONS	53
TABLE 9. SUMMARY OF SOME STUDIES ON THE OPPORTUNITY COST OF TIME	60
TABLE 10. HOW MCC VALUED WOMEN'S TIME SAVINGS IN WATER SUPPLY PROJECTS	62
TABLE 11. SUMMARY OF VALUE OF TRAVEL TIME SAVING ESTIMATES	63
TABLE 12. ORGANIZATIONAL GUIDELINES FOR VALUING UNPAID LABOR AND LEISURE TIME	65
TABLE A-1: KII INSTRUMENTS BY INFORMANT TYPE	69
TABLE B-1. RECENT WORLD BANK ANALYSES REVIEWED BY AUTHORS	71
TABLE C-1. ASSESSMENT QUESTIONS AND REPORT SECTIONS	79
TABLE E-1. USAID CBA REPORTS (2007-2021)	83

## LIST OF FIGURES

FIGURE 1. RELEVANCE OF CBA TO EACH STEP OF USAID PROGRAM CYCLE	6
FIGURE 2. CONSTRAINTS TO INCREASING CBA USE AT USAID	9
FIGURE 3. SHOULD CBA REMAIN OPTIONAL?	10
FIGURE 4: PRESENT VALUE FACTORS WITH DECLINING AND FLAT DISCOUNT RATES USED BY THE U.K. GOVERNMENT	25
FIGURE 5: RECOMMENDATIONS FOR USAID'S DISCOUNT RATE POLICY	28
FIGURE 6. USAID AND NON-USAID INTERVIEWEE VIEWS ABOUT CHANGING DISCOUNT RATES BY COUNTRY AND SECTOR	29
FIGURE 7. DISCOUNTING THE SOCIAL COST OF CARBON DIOXIDE	37
FIGURE 8: EXTRAPOLATING VSLs	49

FIGURE B-1. DISCOUNT RATES IN RECENT WORLD BANK ANALYSES	70
FIGURE D-1. USAID INTERVIEWEE POLL RESULTS: WORK EXPERIENCE BEFORE USAID	82
FIGURE D-2. USAID INTERVIEWEE POLL RESULTS: CBA TRAINING BEFORE USAID	82

## ACRONYMS

<b>ADS</b>	Automated Directives System (USAID)
<b>AfDB</b>	African Development Bank
<b>AFOLU</b>	Agriculture, Forestry and Other Land Use
<b>BFS</b>	Bureau for Food Security (USAID)
<b>BHA</b>	Bureau for Humanitarian Assistance (USAID)
<b>BCR</b>	Benefit-cost ratio
<b>C3</b>	Career Candidate Corps (USAID program to sustain the size of foreign service workforce)
<b>CBA</b>	Cost-benefit analysis
<b>CEA</b>	Cost-effectiveness analysis
<b>CEADIR</b>	Climate Economic Analysis for Development, Investment and Resilience Activity (USAID-funded)
<b>CFOI</b>	Census of Fatal Occupational Injuries (USG)
<b>CO2</b>	Carbon dioxide
<b>CO2e</b>	CO2 equivalent
<b>CSCF</b>	Commodity-specific conversion factors
<b>DALYs</b>	Disability-adjusted life years
<b>DEC</b>	Development Experience Clearinghouse (USAID)
<b>DDI</b>	Bureau for Development, Democracy and Innovation (USAID)
<b>DIV</b>	Development Innovation Ventures (USAID)
<b>DOT</b>	U.S. Department of Transportation
<b>EA</b>	Environmental assessment
<b>EC</b>	European Commission
<b>EMD</b>	DDI Center for Economics and Market Development (USAID)
<b>EMMP</b>	Environmental Mitigation and Monitoring Plan
<b>EPA</b>	U.S. Environmental Protection Agency
<b>EOCL</b>	Economic opportunity cost of labor
<b>ERR</b>	Economic rate of return
<b>FSOs</b>	Foreign Service Officers
<b>GDP</b>	Gross Domestic Product
<b>GH</b>	Bureau for Global Health (USAID)

<b>GHG</b>	Greenhouse Gas
<b>GNI</b>	Gross National Income
<b>GWP</b>	Global warming potential
<b>HHS</b>	U.S. Department of Health and Human Services
<b>HICs</b>	High income countries
<b>IEE</b>	Initial environmental examination
<b>IPBES</b>	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
<b>IRR</b>	Internal rate of return
<b>IWG SC-GHG</b>	Interagency Working Group on the Social Cost of Greenhouse Gases
<b>KIIs</b>	Key informant interviews
<b>LFP</b>	Labor force participation rate
<b>LICs</b>	Low-income countries
<b>LMICs</b>	Lower middle-income countries
<b>LSMS</b>	Living Standards Measurement Survey (World Bank)
<b>MCC</b>	U.S. Millennium Challenge Corporation (USG)
<b>NPV</b>	Net present value
<b>OECD</b>	Organization for Economic Co-operation and Development
<b>OMB</b>	Office of Management and Budget (USG)
<b>PPL</b>	Bureau for Policy, Planning, and Learning (USAID)
<b>PPR</b>	Performance Plans and Reports
<b>PSID</b>	Panel Study of Income Dynamics
<b>QALYs</b>	Quality-adjusted life years
<b>RFS</b>	Bureau for Resilience and Food Security (USAID)
<b>SC-GHG</b>	Social cost of greenhouse gases
<b>SC-CO<sub>2</sub></b>	Social cost of carbon dioxide
<b>SC-CH<sub>4</sub></b>	Social cost of methane
<b>SC-N<sub>2</sub>O</b>	Social cost of nitrous oxide
<b>SOAR</b>	Senior Obligation Alignment Review (USAID)
<b>TDY</b>	Temporary duty
<b>USAID</b>	United States Agency for International Development
<b>USG</b>	United States Government

<b>VSL</b>	Value of a statistical life
<b>VSLY</b>	Value of a statistical life-year
<b>WASH</b>	Water, Sanitation, and Hygiene Program
<b>WTA</b>	Willingness to accept (compensation)
<b>WTP</b>	Willingness to pay



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# EXECUTIVE SUMMARY

The USAID Center for Economics and Market Development (EMD) in the Development, Democracy, and Innovation Bureau (DDI) recognized that the Agency's 2015 guidelines for cost-benefit analysis (CBA) and cost-effectiveness analysis (CEA) required updating and expansion. The 2015 guidelines were not designed for all USAID sectors. Their use was voluntary, and they were not widely disseminated outside of USAID. EMD asked LEAP III to conduct an external assessment to support a subsequent internal revision of the guidelines and to make recommendations for the guidelines' application.

The context for CBA and CEA has evolved considerably within and outside USAID since the Agency prepared the 2015 guidelines. The LEAP III team concurred that it is time to update the guidelines, disseminate them more widely, encourage more consistent uses, and establish a process for systematically reviewing new issues in the future. The assessment team recommended:

- Reducing the focus on summarizing and simplifying basic concepts by directing readers to standard textbooks.
- Addressing key issues that need further clarity for USAID applications. These key issues include the discount rate choice, the social cost of greenhouse gas (GHG) emissions, the valuation of other environmental and natural resource impacts, the valuation of health and safety impacts, and the handling of risk and uncertainty.
- The general guidelines can be supplemented by additional sector-specific guidance. EMD can reinforce its role in developing and maintaining the CBA guidance by working closely with other USAID operating units to help ensure that sector-specific guidance is technically sound, consistent, and relevant.
- EMD should expand its efforts in internal training and dissemination of the guidance and applications of the tools through events, courses, publications, and USAID-supported web portals.<sup>1</sup>

In revising the CBA guidelines, USAID should improve the coverage of the following technical areas:

- **The discount rate for the time value of money.** There will never be a theoretical consensus about the correct discount rate, but many development assistance organizations have changed their guidance on discount rates since 2015. The 12 percent real (inflation-adjusted) economic discount rate recommended by the 2015 CBA Guidelines is at the higher end of the rates used by other United States Government (USG) agencies and development assistance organizations surveyed for this assessment. The assessment team does not recommend allowing the discount rate to vary across countries, sectors, or types of interventions to avoid creating additional distortions, institutional and technical challenges, and complexity.

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<sup>1</sup> Such as sectoral portals listed at <https://www.usaid.gov/partner-with-us/resources-for-partners> (accessed December 19, 2022).

The relatively high economic discount rate in the 2015 guidelines raises concerns about intergenerational equity and long-term environmental impacts. One approach for addressing this issue is using a lower economic discount rate. There are still debates about whether long-term climate impacts can be adequately accounted for at a low discount rate, such as three percent. Discount rates that decrease over time (such as a hyperbolic rate that declines each year) can be another option. However, if the starting discount rate is not sufficiently low and it does not begin to decrease until after 25-30 years, it is unlikely for declining discount rate schedules to make much difference in consideration of intergenerational impacts. Alternatives, such as pricing the short-term outputs and impacts associated with long-term benefits or costs, may be more effective in addressing intergenerational equity issues. These options are only relevant while USAID can choose its discount rate. USG is anticipated to announce a USG-wide discount rate policy that applies to domestic and international CBAs.

- **USAID economic CBAs will need to comply with Executive Order 13990 and incorporate the USG’s preliminary base case estimates of the social cost of greenhouse gas emissions.** The use of these USG-wide values will make it easy to account for the discounted future global costs of greenhouse gas emissions. The USG’s preliminary base case values (Interagency Working Group 2021) were estimated at a three percent real discount rate, much lower than the 12 percent economic discount rate recommended in the 2015 USAID guidelines for CBA Guidelines. However, to avoid increasing complexity, the assessment team recommended that USAID use the official USG values without any adjustment for the differences in the discount rate. **The USG has announced that these preliminary values will be revised, reflecting newer scientific and economic data and more comprehensive modeling.**

Nevertheless, the projected emissions will still need to be estimated. USAID technical staff and consultants can help estimate the GHG emissions associated with specific sources. If specific emission projections are not available, standard (tier 1) emission factors can be used from the Intergovernmental Panel on Climate Change’s Emission Factor Database.<sup>2</sup> Estimates of the GHG emissions in the production and use of various fuels are available from the U.S. Environmental Protection Agency and other sources. USAID funded Winrock International’s development of a simple Agriculture, Forestry, and Other Land Use (AFOLU) Calculator for estimating the GHG emissions from agriculture, forest, and other land uses in developing countries.<sup>3</sup> USAID is currently funding the development of a more accurate AFOLU tool.

**USAID funded an external assessment of approaches to integrating the value of environmental services in CBA (Kashi et al. 2018). Although that assessment offers operational advice, it has not been adopted as official Agency guidance, and data gaps pose significant challenges to its use in a CBA.** EMD can incorporate recommendations from the assessment of environmental valuation in revising the general 2015 CBA Guidelines. It can also prepare or support the development of sector-specific CBA guidance that addresses environmental and natural resource valuation. EMD can also offer training courses on environment and natural resource valuation.

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<sup>2</sup> <https://www.ipcc-nggip.iges.or.jp/EFDB/main.php> (accessed December 19, 2022).

<sup>3</sup> <http://afolucarbon.org/> (accessed December 19, 2022).

- **The value of a statistical life (VSL) is a monetary price for valuing increases or decreases in premature human mortality risks. The U.S. Department of Health and Human Services (HHS), U.S. Environmental Protection Agency (EPA), U.S. Department of Transportation (DOT), and most recently, Millennium Challenge Corporation (MCC) have adopted versions of this approach. However, there is no USG-wide guidance to ensure consistency in the values or types of data.** In the absence of official estimates, most applications of the VSL have used an adjusted benefit-transfer approach to convert reference values for high-income countries to presumed equivalents for low- and middle-income countries. Theoretical and empirical issues remain on the reference VSL, elasticities for conversions based on per capita GDP, age adjustments, and application for nonfatal morbidity risks.

The USAID Global Health Bureau (GH) has relied on CEA instead of CBA, which avoids the controversial additional step of placing a monetary value on human lives. Instead, it focuses on the cost per life saved or disease case averted. Other USAID operating units also make funding decisions affecting human mortality and morbidity rates, such as those related to air pollution or disaster risk reduction. If USAID decides to use CBA in making health-related funding decisions or evaluating activities or alternatives (which may not be necessary), it should ensure consistency in the approaches and numbers.

- **The 2015 CBA Guidelines provide guidance on estimating the value of time.** The market time section of this guidance aligns well with some of the most recent guidelines on this subject, such as Robinson et al. (2019), i.e., Harvard Reference Case. However, there is room to broaden and update the coverage for the valuation of non-market time. For example, unpaid care work, sector-specific valuation, and cross-cutting areas such as the valuation of changes in time allocation for children. While there are variations in how different developmental assistance organizations approach the valuation of time, the assessment team recommends the revised guidance to align its valuation of time method with Robinson et al. (2019).
- **The 2015 CBA Guidelines discuss sensitivity analysis, Monte-Carlo simulations, and break-even analysis as the primary tools for risk analysis.** A companion report provides feedback and recommendations on integrating risk and uncertainty in CBA with an expected publication date in the first quarter of 2023.
- **Although evidence remains a critical barrier, the 2017 USAID guidelines on integrating gender into CBA cover the essential steps for CBA practitioners.** This assessment did not include a detailed review of the existing guidelines and practices on integrating gender into CBA. However, the assessment team is familiar with the current guidelines (Watt et al. 2017) and the newly published National Strategy on Gender Equity and Equality (The White House 2021a). On this basis, this assessment report recommends that EMD focuses on updating Watt et al. (2017) with guidelines, methods, and other literature published since 2017.

**CBA use has varied at USAID over the past four decades.** In the mid-1980s, CBA fell into disuse at USAID when the Agency began emphasizing non-project assistance. In 2010, CBA was reintroduced at USAID after the Agency had re-emphasized project assistance and issued new guidance on the program, project, and activity design process. EMD's predecessor unit (the Economic Policy Office in the Economic Growth, Education, and Environment Bureau) trained many USAID staff in CBA. It also prepared CBAs for other operating units and programs, such as the Feed the Future Initiative.

**USAID should revitalize efforts to promote the use of CBA and CEA in the design, implementation, and evaluation of its investments and other interventions. This will require further promotional and capacity development efforts to generate greater demand for CBA and its guidance.**

To encourage greater use of CBA, EMD can:

- Encourage USAID staff to commission more CBAs by creating templates, concept notes or general guidelines for how to incorporate CBA into solicitations and other procurement documents;
- Formulate strategic relationships with USAID operating units that are collecting rigorous costing data and impact evaluation data, which will serve as inputs to the CEA or CBA studies;
- Make the CBA guidance more accessible within the Agency and publicly;
- Increase tailored training and awareness building of various durations for management and staff in USAID/Washington and the field;
- Reinvigorate efforts to explore strategic opportunities to increase the use of CBA by collaborating with other operating units in designing, conducting, and reviewing, and sharing findings and recommendations of CBAs;
- Continue to develop and manage buy-in mechanisms to simplify procurement of external services; and
- Share findings and recommendations of CBAs through central repositories, webinars, events, presentations, and briefers.

**Making CBA use mandatory at USAID would be impractical** since much of the Agency's assistance is multifaceted and supports capacity development, technical services, advocacy, blended financing, and learning and networking that are difficult to assess in a CBA. CBAs are most appropriate for USAID investments in infrastructure, agriculture, other market activities, education, health, and policy and regulatory decision-making support.

# I. INTRODUCTION AND BACKGROUND

This report assesses USAID's 2015 guidelines on cost-benefit analysis (CBA) and cost-effectiveness analysis (CEA). The Center for Economics and Market Development (EMD) in the Bureau for Development, Democracy, and Innovation (DDI) has a lead role in this area (USAID 2022a). EMD recognized that the 2015 guidelines required updating and expansion. EMD asked LEAP III to conduct an external assessment to support a subsequent internal revision of the guidelines and make recommendations for how the guidelines should be applied. The findings of this report will also be useful for other USAID operating units and implementing partners, as well as other development assistance organizations that use CBA to inform investment decisions.

CBA is a quantitative tool for comparing the costs and benefits of an investment or policy in monetary terms, adjusted for the time value of money. Converting all impacts to monetary terms allows for a direct comparison of benefits and costs and facilitates assessing whether the benefits outweigh the costs. CEA estimates the present value of the costs per unit of the desired result. Therefore, CEA is used when the benefits can be quantified but are difficult to value in monetary terms. CEA is also useful for finding the least-cost alternative for achieving a specific amount of the result. For simplicity, the rest of this report uses the term CBA to refer to both cost-benefit analysis and cost-effectiveness analysis.

EMD's predecessor office prepared the 2015 CBA Guidelines for Agency staff use. These guidelines were not designed to fit all USAID development sectors. They primarily focused on agriculture, the subject of most of the CBAs conducted by USAID staff then. The guidelines were not widely disseminated outside of USAID. USAID did not require the use of the guidelines, and their use has been inconsistent across operating units and over time.

In addition to the renewed interest in providing central support for the technical work at missions, the broader U.S. Government (USG) context has also motivated the need for applied guidance. In 2021, Executive Order 139990 required all USG agencies to integrate the social cost of carbon in their regulatory analyses. Subsequently, the Interagency Working Group on the Social Cost of Greenhouse Gases (IWG SC-GHG 2021) set a preliminary social cost of carbon of \$51 per metric ton of carbon dioxide equivalent by adjusting the 2013 value for inflation. The USG announced that it would revise the preliminary value in 2022 to reflect newer scientific and economic data and better modeling. In addition, the USG has required the integration of gender equity and equality in technical analyses (The White House 2021a).

This assessment of the 2015 USAID CBA guidelines was subcontracted to Limestone Analytics under the USAID-funded Learning, Evaluation, and Analysis Project III (LEAP III) Activity held by Integra as the prime contractor. The main audience for this assessment is EMD. However, the findings and recommendations in this report are relevant for various USAID operating units, other USG Agencies, and other development assistance organizations.

This assessment addresses 14 questions in the scope of work (SOW) on institutional, theoretical, and practical aspects of CBA at USAID. The assessment team recategorized the original questions for greater clarity and decided that it was important to look at CBA use at USAID since this is closely related to the content of the guidelines. Annex C contains the SOW and research questions. Table C-1 in Annex C maps the report sections to the questions in the SOW.

The assessment team began by reviewing key USAID documents and other literature. In consultation with USAID, the team conducted six small group interviews with 13 people and 37 key informant interviews –

50 respondents. The assessment team and USAID identified the interviewees based on the following criteria:

1. Experience and roles at USAID,
2. Knowledge of CBA through training,
3. Knowledge or experience with the USAID CBA guidelines,
4. Relevant experience at other development assistance organizations, and
5. Technical expertise in cross-cutting areas.

Annex D describes the sample of interviewees. The small group and key informant interview instruments focused on CBA use at USAID, and technical and thematic questions based on the interviewee's roles and technical experience.

All interviews were conducted remotely due to pandemic restrictions. Since the sampling strategy was based on familiarity with CBA, it was purposive rather than random. The predominance of economists with specific knowledge of CBA in the sample may result in some sampling bias because the interviewees may be more favorably inclined toward this tool than most USAID staff. However, since CBA was not a mandatory tool at USAID, a random sample of staff would not have been able to offer useful insights on revising the CBA guidelines.

After processing the information collected in the small group and key informant interviews, the assessment team conducted eight additional interviews with senior USAID management. The subsequent interviews intended to share some initial findings and recommendations and obtain additional insights on the role of CBA at USAID and how staff can promote greater use of the tool.

Section 2 of this report discusses the role of CBA at USAID. Section 3 contains a general assessment of the 2015 CBA Guidelines. The report then examines cross-cutting areas informed by expert opinions, research findings, and practical issues. Section 4 addresses the discount rate. Section 5 covers the social cost of greenhouse gas emissions. Section 6 discusses the valuation of environmental services. Section 7 is concerned with valuing mortality and morbidity risks. Section 8 summarizes the valuation of unpaid labor time. Section 9 reviews USAID's guidance on integrating gender issues in CBA (Watt et al. 2017). A companion report focuses on handling risk and uncertainty in CBA, with an expected publication date in the first quarter of 2023.

## 2. COST-BENEFIT ANALYSIS AT USAID SINCE 2010

**Beginning in 2010, CBA was reintroduced at USAID after a period of disuse since the mid-1980s** (Bahn and Lane 2012). Starting in 2010, the Economic Policy (EP) Office (now EMD) was responsible for:

1. Launching CBA courses to build awareness and capacity among USAID economists and a variety of other officers,
2. Co-designing CBA courses with other technical units (i.e., with the energy office, transport office, climate change office, Bureau of Resilience and Food Security, and the Bureau for Global Health (GH)),
3. Managing a CBA newsletter highlighting resources and tips to a broad USAID audience,
4. Developing and delivering training materials,
5. Collaborating with other operating units on CBAs (e.g., Feed the Future and Development Innovation Ventures (DIV) programs), and
6. Writing the 2015 CBA Guidelines.

Since 2011, EP staff trained over 800 USAID staff, partner country counterparts, implementing partners, and colleagues at Millennium Challenge Corporation (MCC), the U.S. Environmental Protection Agency (EPA), U.S. Department of Agriculture, and the U.S. Department of State. The EP team also hosted regular brown bags and thematic webinars for USAID staff of various offices participated in sector conferences focused on CBA, and prepared blogs and social media posts to promote CBA inside and outside the Agency. These efforts were complemented by the hiring of a large number of new Foreign Service Officers (FSOs) to focus on Economics (backstop 11) and Private Sector Engagement (backstop 21). Most of these new FSOs spent up to a year in USAID/Washington (including the Economic Policy Office and other rotations) before being assigned to an overseas post. The FSOs received substantial training in Washington, D.C., and had access to temporary duty (TDY) field travel funding. When CBA was reintroduced to the Agency, many new FSO economists were asked to work on a CBA for a mission or USAID/Washington operating unit.

**However, the role of CBA has diminished since 2016.** Following a period of rapid staff turnover, the size of the CBA team shrank within the Economic Policy Office and its successor, EMD. At the same time, the number of economist positions within the Agency has declined significantly. As of 2022, there are only twenty-seven economists on staff. This includes only seven FSOs assigned to field missions, down from 28 in 2012. These events led to a much smaller team, which coincided with the end of the commitment to perform CBAs with the Feed the Future Initiative, which was driving significant demand for CBAs. Furthermore, many FSOs hired in the Economics backstop were posted to Missions in non-Economist positions with different work responsibilities.

Additionally, a new Chief Economist arrived in 2016, who asked the EP team to focus on other analytical work, such as Country Economic Reviews. According to some respondents, this reduced the EP staff time available to promote, provide training, and conduct CBAs at USAID. This may have diminished the demand for CBAs across the Agency. A relatively small number of CBAs continued to be conducted by USAID staff, and contractors, through contracts such as the three Learning, Evaluation, and Analysis Projects (LEAP I, II, and III) and the Climate Economic Analysis for Development, Investment and Resilience (CEADIR) Activity. Annex E contains a list of the CBA reports under these contracts.

**CBAs have never been mandatory at USAID, but principles of cost-effectiveness are woven into parts of USAID's Program Cycle and sectoral policies.** USAID's operational policies in the



Automated Directives System (ADS) 201.3.4.5 recommends CBA as a useful, optional tool in activity design. Currently, most awards planned above \$50 million require a mandatory Senior Obligation Alignment Review (SOAR) process for a document that justifies the activity. The SOAR guidance lists CBA as one possible tool to address the mandatory question, “What has been the use of evidence and assessments and/or analysis in designing this activity?” (ADS 300.3.4.3 and its mandatory reference template). However, CBAs may not be appropriate for many activities that require a SOAR, such as broad inter-agency agreements.

USAID (2021) launched an Economic Growth Policy that emphasized cost-effectiveness as one of six principles to guide the Agency’s economic-growth programs.<sup>4</sup> The USAID (2018) Education Policy also emphasizes cost-effectiveness and value-for-money.

**Current USG requirements for CBA in Federal regulatory decision-making do not apply to USAID foreign assistance programs. However, the Office of Management and Budget (OMB) is considering the development of broader guidelines on when and how Federal agencies should use CBA.** OMB Circular A-4 provides guidance to Federal agencies on regulatory analyses required under Executive Order 12866 (“Regulatory Planning and Review”) and the Regulatory Right-to-Know Act. This 2003 guidance addresses CBA for regulatory actions. USAID foreign assistance does not constitute a regulatory action. Furthermore, the current version of Circular A-4 only focuses on benefits and costs that accrue to citizens and residents of the United States. The assessment team could not obtain an interview with OMB, but two OMB representatives agreed to answer questions from an EMD staff person. The OMB representatives stated that the Executive Branch office planned to prepare new guidance in 2022 on Federal agency use of CBA and issues such as the discount rate selection.

**CBAs are an optional tool at USAID that is used on an ad-hoc basis.** The ADS does not require CBA or CEA at any stage of USAID’s Program Cycle (strategic planning, project and activity design and implementation, monitoring, and evaluation). USAID interviewees reported that the CBAs were conducted or commissioned using a bottom-up approach initiated by a small cohort of CBA champions within the Agency.

USAID and IPs have conducted CBAs of 120 interventions since 2011. EMD has identified 38 publicly available reports on CBA between 2012 and 2021; 26 focused on agriculture or livestock, five on energy, two on fisheries, two on crime and security, two on health, and one on tourism.

Between 2012 and 2014, the USAID Bureau for Food Security (BFS) collaborated with the EP Office and mission staff on CBAs of 45 Feed the Future projects in 23 countries. In 2015, BFS commissioned CBAs that looked at activity results around the midterm or completion dates in 11 countries. BFS commissioned a comparison of the findings from these CBAs (Bae et al. 2017).

**A recent development will increase the use of a simplified version of CBA in one USAID program.** In 2021, the USAID Bureau for Humanitarian Assistance (BHA) issued guidance for implementing partners to prepare an ex-ante Participant Financial Analysis of on-farm and off-farm livelihood interventions. This is a simplified version of a financial analysis, which will be required for BHA’s Resilience Food Security Activities. The analysis is based on net incremental revenues in a typical year, rather than a multiyear period that would require discounting for the time value of money. The analysis

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<sup>4</sup> The six principles are that programs should be 1) assisting partners to become self-financing; 2) prioritizing inclusion, sustainability, and resilience; 3) systemic or catalytic; 4) cost-effective; 5) innovative, data-driven, and adaptive; and 6) benefiting or showing a strong potential to benefit the U.S. economy and the American People.

does not consider donor or implementing partner costs because the focus is on incentives for participants (for more information, see Schubert and Kashi 2021).

**Several recent developments may expand cost analysis, but not necessarily CBA.** An October 2020 revision to ADS 201.3.6.4 required cost analysis in all impact evaluations.<sup>5</sup> This ADS section does not define a “cost analysis” or set Agency-wide standards. Separately, the USAID Education Office released its guidance on cost analysis for education activities (Walls et al. 2021). That guidance identified cost analysis to include cost-economy analysis, cost-efficiency analysis, cost-effectiveness analysis, and cost-benefit analysis.

In March 2022, the USAID Policy, Planning, and Learning Bureau (PPL) published a discussion note on cost data collection and analysis (USAID 2022b) that adopted the Education Office’s cost analysis definition. However, cost analysis does not necessarily imply cost-benefit analysis.

In 2021, the University of California Berkeley’s Center for Effective Global Action received funding from EMD to develop costing guidelines and tools for BHA. This may provide structure and consistency for capturing cost data supporting impact evaluations for BHA.

## **DEMAND FOR INCREASED USE OF CBA AT USAID**

**Nearly all of the USAID interviewees in this assessment supported increasing the use of CBAs at USAID, particularly for activity design, implementation, monitoring, and evaluation.** Only one interviewee thought USAID would not benefit from increased use of CBAs because the reports tend to “sit on a shelf”. This respondent cautioned that any effort to increase USAID use of CBAs needs to ensure that they include actionable insights for non-economists managing activities at USAID.

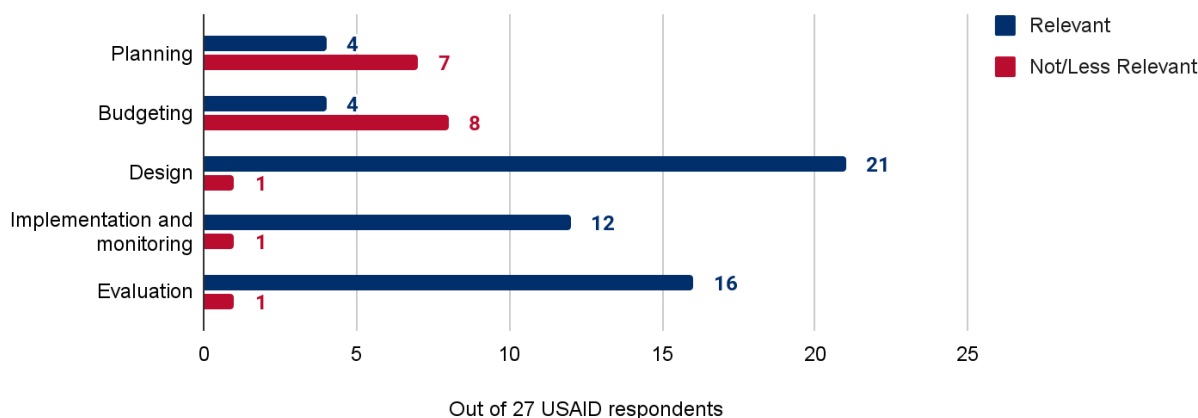
Most interviewees agreed that both internal and external CBAs are generally high-quality analyses offering valuable insights. While most of the 27 USAID respondents to this question felt that CBAs could have value in activity design, implementation/monitoring, and evaluation, there was more disagreement about CBA’s value in planning and budgeting (Figure 1). Interviewees were allowed to list more than one step in the Program Cycle in their responses.

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<sup>5</sup> USAID distinguishes between performance evaluations and impact evaluations. Performance evaluations can use a broad range of evaluation methods and do not involve an experimental or quasi-experimental approach. Performance evaluations may include before and after comparisons with baseline data, but lack a rigorously defined counterfactual. They address descriptive, normative, and/or cause-and-effect questions. USAID defines an impact evaluation as a structured test of one or more hypotheses underlying a program or project intervention that involves a comparison between those affected by the intervention and a comparable group or area that was not affected by the intervention. USAID requires that impact evaluations be conducted, if feasible, of any new, untested approach that is anticipated to be expanded in scale or scope through U.S. Government foreign assistance or other funding sources (i.e., a pilot intervention).

**FIGURE I. Relevance of CBA In Each Step of the USAID Program Cycle**

At what programmatic step is CBA relevant?



The concerns around planning and budgeting primarily focused on the scope and timing of a CBA, which is typically best after specific alternative interventions have already been identified. However, planning and budgeting processes at USAID occur before interventions can be designed. Since the U.S. Congress specifies USAID country and sectoral budgets in great detail, the Agency cannot use CBA to allocate budgets across countries and sectors. Some respondents stated that CBA is more relevant for activity-level budgeting than portfolio/country-level budgeting.

In addition, the award solicitation and procurement process are so long and laborious, and pressures to obligate appropriated funds before they expire make it necessary for USAID to issue substantial grants and contracts, typically for five-year periods. As a result, USAID's activity design process focuses on high-level objectives, targets, and general approaches rather than specific interventions that can be more easily appraised through CBA. Grant and contract recipients often design specific interventions in the annual workplan process after receiving their awards. It is often more appropriate for the implementing partners to use CBA to inform these decisions than for USAID at an earlier stage. CBA is highly relevant in the evaluation and learning stage of the program cycle but has been largely unused in USAID evaluations.

Table I lists the common benefits and limitations of CBA at various steps of USAID's Program Cycle.

TABLE I. COMMON BENEFITS AND LIMITATIONS OF CBA AT EACH STEP OF THE USAID PROGRAM CYCLE		
Step	Benefits of CBA	Limitations of CBA
Country/regional strategic planning	A simplified CBA may be useful for setting priorities among different activity options within sectors	Strategy development is much broader than the typical scope for a CBA

**TABLE I. COMMON BENEFITS AND LIMITATIONS OF CBA AT EACH STEP OF THE USAID PROGRAM CYCLE**

Step	Benefits of CBA	Limitations of CBA
Budgeting	<p>Simple CBAs or CEAs may be useful for scoping the resources needed to achieve desired outcomes and impacts</p> <p>CBA is more useful in the activity-level budgeting process than the higher-level budgeting</p>	<p>USAID's budgeting process is done at a higher level without specifics on interventions, making it difficult to do a CBA</p> <p>The budgeting process is complicated at USAID and subject to Congressional earmarks and directives, whole-of-government Initiatives, and administration and agency priorities. Congressional appropriations for USAID are overspecified by country, sector, and priorities, and an annual 653a process is needed to reconcile the competing constraints. The political context of the budget makes it difficult for USAID to use CEA or CBA in the budgeting process</p>
Activity design (pre-award)	<p>CBA can be useful for improving project/activity design, challenging implicit assumptions, and providing information for credible and accountable decision making</p> <p>Improves resource allocation by identifying alternative investments with higher expected development returns</p> <p>Can be used to show who benefits by socioeconomic group, gender, or location</p> <p>Emphasizes sustainability from the start</p> <p>Can assess the risks an intervention faces</p> <p>Could improve the understanding of the financial incentives of partners or stakeholders</p>	<p>Limited time to design and procure an activity after funds are allocated, which is often late in the fiscal year</p> <p>Concern that USAID staff may not be incentivized to conduct a rigorous analysis, but rather to demonstrate the value of their activity design after they have put a significant amount of work into it</p> <p>Some activities are not appropriate for CBA pre-award (e.g., BHA's Resilience Food Security Activities, grants, cooperative agreements). This would put the effort of conducting CBAs on the implementing partner rather than on internal USAID staff</p>
Implementation and monitoring	<p>Establishes realistic activity targets that can be tested against actual outputs and outcomes</p> <p>Allows activity managers to determine if targets are met at any stage of the intervention</p> <p>Helps to ensure that costs of the intervention stay in line with expected expenditures and outcomes</p> <p>Halfway through implementation, activity managers have much better data (including baseline data), to compare ex-ante CBA models to monitoring actuals or update CBA models to inform mid-course adaptive changes in implementation to maximize net benefits if warranted</p>	

**TABLE 1. COMMON BENEFITS AND LIMITATIONS OF CBA AT EACH STEP OF THE USAID PROGRAM CYCLE**

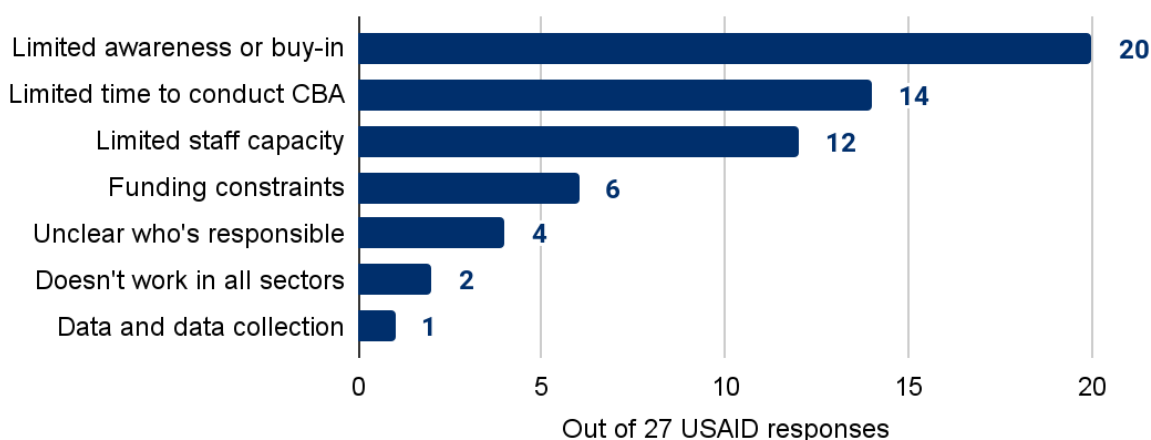
Step	Benefits of CBA	Limitations of CBA
Evaluations	<p>Can be used to inform future activity designs</p> <p>CBA's are particularly well suited to impact evaluations, which rigorously quantify the benefits (as opposed to performance evaluations)</p> <p>CBA's during evaluation can be used to examine if activity design ambitions are realized during implementation</p> <p>When CBA's are done after activity design, they can be updated to compare against baseline scenarios and ex-ante projections.</p>	<p>Some interviewees were unsure how often evaluation findings are used to inform future activities at USAID</p>

**A CBA may be more feasible at later stages of the program cycle.** An activity design is often not very specific in the early stages, making it difficult to specify the interventions and their costs and benefits. Specific interventions may be identified and designed after a grant, cooperative agreement, or contract is awarded during workplan preparation, data collection, and implementation, making a CBA more feasible. CBA can also be useful in midterm and final evaluations. Midterm evaluations can inform mid-course corrections. Final evaluations can inform the design of extensions, expansions, follow-on activities, and replications in different locations or even sectors. Many evaluation questions focus on cost-effectiveness, but evaluators do not always use CBA methods to address such questions. While CBA has not been included in many USAID evaluations, there is much potential for promoting the use of this tool to improve the design of future interventions, especially for activities with similar theories of change (e.g., Feed the Future and BHA Resilience Food Security activities).

## CONSTRAINTS TO INCREASED USE OF CBA

**However, many internal interviewees noted constraints to the increased use of CBAs, particularly limited awareness or demand for use of the tool.** Even the most enthusiastic supporters of CBAs at USAID noted challenges in its practical application in the Agency. Most of the 13 internal respondents for this question identified awareness and demand as the largest constraints to using CBAs pre-award. Limited demand often means that senior-level managers may not see the value of CBA or have an interest in this tool and therefore are not asking their staff to perform or commission this analysis. Few activity designers and managers even consider performing this analysis. Other comments centered around non-economists not understanding the analysis or the value in conducting the analysis, compounding the limited demand for CBAs, or limiting the use of CBAs if they are performed by economists.

**FIGURE 2. Constraints to Increasing CBA Use at USAID**



**Limited time was the second-most frequently reported constraint due to competing priorities.** Many noted that activity design can be a rushed process that leaves little room for a CBA. Some respondents reported that there is “analysis fatigue,” and the Agency is already trying to reduce the time and effort required in activity design. Performing a CBA runs counter to that objective. Even individuals who value CBA found they have little time to perform the analysis themselves, given other competing priorities. USAID supports a lot of training and other capacity development as well as policy advocacy and analysis activities in which CBA is irrelevant.

**Over half of the internal respondents also suggested that limited capacity among USAID staff was a significant constraint.** Many respondents pointed out that only economists are equipped to do this analysis, and there are few economists spread throughout Missions worldwide. These economists also have many other responsibilities that do not involve economic analysis. The unit within EMD responsible for CBA has little program funding and is too small to conduct many CBAs, but it can provide contractual mechanisms and technical support. Several respondents noted that few of the economists trained in the one-month CBA courses have ever performed a CBA, and even fewer regularly prepare CBAs. EMD reports that 666 non-economists have been trained in order to familiarize people with CBA; however, interviewees were not familiar with many instances of non-economists subsequently conducting or commissioning a CBA. Technical skills and capacity to conduct or understand a CBA are not the only constraints to greater use of CBA at the Agency.

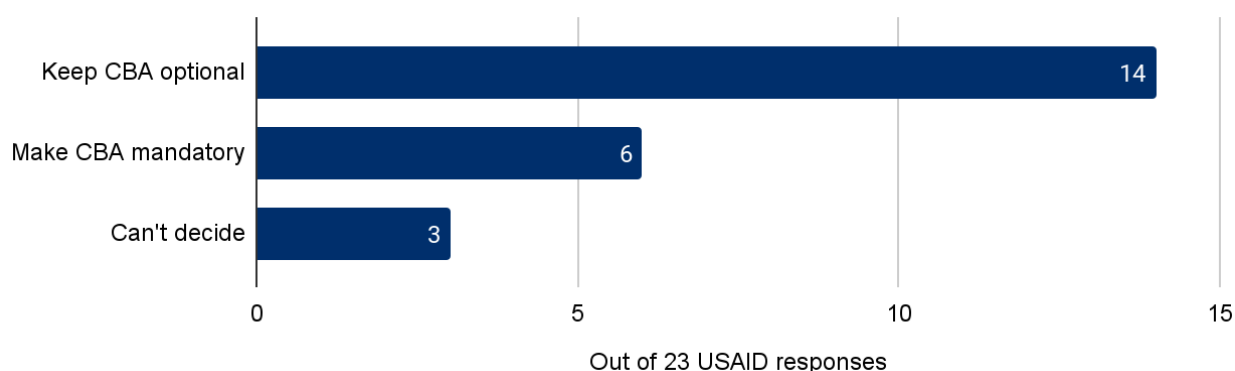
**Other issues raised less frequently by internal respondents include lack of funding, unclear responsibility for CBAs, and difficulties in data collection.** Six respondents suggested that Missions do not have the funding for CBAs, and that EMD should be responsible for financing or performing these analyses (however, EMD responded to this statement by indicating that they have limited program funds to support analysis). Others suggested that there is plenty of funding, especially for larger activities where the CBA can be made a requirement in contracts and cooperative agreements. Other specific concerns were:

- Data are difficult to collect;
- It is unclear who is responsible for conducting or commissioning a CBA throughout implementation;
- CBA does not lend itself well to all sectors (e.g., democracy and governance); or,
- The lack of a mandatory process leads to confusion for USAID officers of when to do or commission a CBA.

**Most USAID respondents agree that CBAs should not be mandatory.** Reasons to keep CBA optional included limiting the burden of required analyses (in line with USAID's current efforts to reduce required analyses throughout the Program Cycle) and that many activities do not lend themselves well to CBA (e.g., emergency response, possibly grants, locally led development activities where capacity may be lower, administration level priorities).

One USAID respondent suggested that keeping CBAs optional will increase the chance that the results will be used. Even the six USAID respondents who thought CBA should be mandatory mostly agreed that this would be impractical for all activities. Some proposed mandatory CBAs should only apply to activities with budgets above a high threshold, such as in agriculture, global health, energy, and Power Africa investments. The undecided were torn between perceiving a CBA mandate as a bad idea but concerned that CBAs would not be used appropriately at the Agency without a mandate.

**FIGURE 3. Should CBA Remain an Optional Tool?**



## RECOMMENDATIONS FOR USAID

- 1. Encourage more commissioned CBAs.** Given the time constraints reported by USAID officers, commissioning CBAs as part of the award may be a good way to ensure that programming incorporates principles of value for money. This option addresses concerns that USAID staff do not have the time or capacity to conduct CBAs themselves and that the most appropriate timing may be post-award when the possible interventions are more clear. EMD could create templates, concept notes, or general guidelines for how to incorporate CBA into solicitations and other procurement documents. EMD could also help other operating units develop scopes of work for CBAs.

EMD could complement this with training tailored to understanding the results of a CBA and the types of decisions this tool can inform.

- 2. Explore strategic opportunities to use CBA**

- a. EMD could provide CBA support for impact evaluations to fulfill or go beyond the more limited, new cost analysis requirement in the ADS. EMD, with PPL, could also explore ways to encourage evaluators to use CBA when addressing questions of cost-effectiveness in performance evaluations.
- b. Additional opportunities may exist in sectors that are most appropriate for CBA, such as agriculture, infrastructure (energy, roads, water), education, and health when requested by other operating units and a budget is available to cover the costs. EMD can also continue to increase awareness of the value of CBA to stimulate demand and identify new

opportunities. EMD can also highlight how CBA can help with key areas of focus such as climate, anti-corruption, labor, gender, and localization.

- c. EMD can approach bureaus to identify where CBA can help them make headway with decisions about activities. For instance, the Feed the Future initiative is expanding its focus countries, and this might be a good time to engage RFS to use CBA for informing the initiative's implementation plans.
- d. Mission economists (the few that remain) are interested in ways to engage in applied analysis. Practice and teaching of CBA can provide engagement opportunities between mission economists and local universities.

### **3. Build awareness and demand**

- a. EMD can disseminate CBA information using existing channels such as ProgramNet (for USAID staff), Learning Lab, and the various external resource portals<sup>6</sup> (for USAID clients, implementing partners and the broader development community), and EconNet Community of Practice. These communications can include testimonials about the use of CBA by current staff.
- b. There are additional opportunities for short courses for staff and senior management that may help broaden the demand for CBA by helping individuals to understand how and when these tools can be useful. These courses may focus less on developing the ability to conduct a CBA, and rather focus on when to ask for or commission a CBA and why (to complement the first recommendation above).
- c. Training efforts could be coupled with efforts to partner with Bureau for Policy, Planning, and Learning (PPL) in promoting these tools throughout the Program Cycle in courses and communications in technical groups with the program and technical officers (this would not be appropriate for CBA skills development, but may be possible for raising awareness about the tool).
- d. Building awareness and demand among senior USAID officials may also encourage greater CBA use. Several interviewees noted instances when Mission Directors or Office Directors were advocates of CBA and the impact it had on the use of this tool). Engagement by the Chief Economist and the Office of the Chief Economist could also be influential.
- e. EMD can increase targeted communications (e.g. with presentations, briefers) with selected operating units, and key contacts, and at events, such as the annual Mission Director and Program Officer conferences.
- f. USAID can highlight the use of CBA for policy and regulatory decisions as well as investments.

### **4. Make CBA resources more accessible.**

- a. USAID should consider a dedicated central mechanism and ideally identify funding if possible for supporting CBA methods and practice, and the dissemination of related information internally and externally.

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<sup>6</sup> <https://www.usaid.gov/partner-with-us/resources-for-partners> (accessed December 19, 2022).



- b. EMD could offer a light version of the CBA training online for easier participation and reach.
- c. EMD could create a dedicated list of existing CBAs that is accessible to staff and the public and regularly updated. Such a public-facing page already exists<sup>7</sup> with a small number of CBAs published; however, a more comprehensive site would be useful.

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<sup>7</sup> <https://www.usaid.gov/node/28721> (accessed December 19, 2022).

### 3. OBJECTIVES AND USE OF THE 2015 CBA GUIDELINES

**The objectives of the 2015 CBA Guidelines are aligned with the role of CBA at USAID, but their use has been limited.** EP developed the 2015 CBA Guidelines to provide clarifications where “standard references provide conflicting or unclear guidance.” The Guidelines emphasized how to perform a CBA rather than mandating an approach and the recommendations have minimal prescriptive language. They aligned well with the practice of CBA at USAID. Sixteen of the 26 USAID interviewees have never used or shared the 2015 CBA Guidelines for conducting a CBA.<sup>8</sup> These observations are not surprising because:

1. CBA use is optional and limited at USAID,
2. The 2015 CBA Guidelines are not mandatory for USAID-prepared or commissioned CBAs, and
3. Although the guidelines were promoted at staff training, they were only posted on an internal staff intranet page and were not publicly distributed or available on a public USAID webpage.

**For the most part, the 2015 Guidelines targeted economists and private sector officers with limited experience in conducting CBAs who had taken a short training in the subject.** USAID staff delivered these CBA trainings; many of the trainers had helped write the guidelines and/or participated in internal CBAs prepared after 2010 (mostly agriculture-related). The Guidelines provided simpler explanations of many of the fundamental CBA concepts available in other textbooks and practical recommendations, particularly for agricultural CBAs. However, they did not

1. Cover more advanced topics,
2. Address issues in applying CBA in other sectors, nor
3. Target non-economists involved in the design and approval of USAID activities.

Some interviewees reported that many USAID economists also referred to other textbooks and training materials for guidance on CBA. In revising the guidelines, it may be preferable to direct users to standard references on fundamental and advanced CBA concepts, rather than duplicating them in simplified form. Examples of standard references include

- Gittinger (1982),
- Tan et al. (2001),
- Sartori et al. (2014),
- Campbell and Brown (2022),
- Jenkins et al. (2011),
- Asian Development Bank (2017),
- MCC (2017, 2021), and
- Robinson et al. (2019).

The guidelines could then focus on what to do when the standard references do not offer clear guidance due to academic or practical debates and provide USAID-specific recommendations. The revised USAID guidelines should also have a broader scope beyond the agricultural sector.

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<sup>8</sup> The assessment team does not know how many of the interviewees conducted or commissioned a CBA since the guidelines were finalized.

**Guidelines can have a short annex or a separate note on using CBA for non-economists.**

Some interviewees highlighted the importance of helping USAID non-economists and decision-makers understand how CBA can help within the USAID Program Cycle. For an audience of non-economists, dedicated content on why a USAID officer might want to conduct a CBA, what questions these tools can address, and how they could be useful within the Program Cycle. EMD has already written some briefing materials on resources available to support the preparation of a CBA that could be expanded. Additional efforts to raise awareness of CBA for non-economists may be necessary.

**The 2015 Guidelines are not the only relevant documents at USAID.** The assessment team also reviewed five other USAID-funded or produced documents that provide guidance on CBA:

- Integrating Gender in Cost-Benefit and Cost-Effectiveness Analysis (Watt et al. 2017)
- Mangrove Ecosystem Valuation: Methods and Results (Smith et al. 2018)
- Integrating Ecosystem Service Values into Cost-Benefit Analysis: Recommendations for USAID and Practitioners (Kashi et al. 2018)
- Cost-Benefit Analysis (CBA) in Resilience Programming (Schubert 2020)
- Cost-Analysis Guidance for USAID-Funded Education Activities (Walls et al. 2021)

There may be some inconsistencies in terminology, approaches, or recommendations of the above reports and the 2015 USAID CBA guidelines because the latter were optional and not widely disseminated internally or publicly. For example, the optional cost analysis guidance for USAID educational activities (Walls et al. 2021) recommended a 10 percent annual discount rate for USAID education activities, while the 2015 CBA Guidelines recommended a 12 percent real economic discount rate. EMD was aware of this difference and was comfortable with differences in approaches across USAID sectors. The USAID Global Health Bureau prefers CEA over CBA and has used a three percent discount rate for health cost-effectiveness analyses. It may be challenging for USAID implementing partners to navigate differences in recommendations across sectors, and it may be useful to clarify in any revised guidance that sectoral recommendations provided by different USAID offices are also acceptable.

Most of the other five documents are publicly available on the USAID Development Experience Clearinghouse (DEC), which is a general requirement for contractor reports. The 2015 CBA Guidelines were prepared by USAID staff and did not have to be posted on the DEC. This leaves USAID partners without a central resource to guide CBA, especially in sectors that are not covered by the publicly available guidance documents.

**Interviewees considered training and wide distribution to be the best methods for promoting revised CBA Guidelines.** When the 2015 CBA Guidelines were developed, USAID promoted CBA through newsletters, blog posts, short and long training courses, regular inter-office meetings, and presentations. Except for the regular inter-office meetings, EMD has continued to promote CBA use, but the intensity of the promotional activities has decreased (see section 2). After the guidelines are revised, EMD staff should revitalize these dissemination efforts. Some respondents also suggested other means of promoting the Guidelines, such as exploring if they can be part of mandatory training offered by other offices (e.g., PPL), creating short technical courses on Guidelines updates, and making social media postings about the revised CBA Guidelines for an external audience a routine part of EMD's operation.

## **TECHNICAL COVERAGE AND UNDERLYING THEORIES**

**The USAID (2015) CBA Guidelines followed the methods described in the “Yellow Manual.”**

The Yellow Manual (Jenkins et al. 2011) and Florio and Pancotti (2022) recommended starting a CBA of an investment decision with a financial cash flow statement and then expanding the analysis to arrive at the net economic effects on society. This approach is common in the loan appraisal process of multilateral development banks.

Alternatively, Boardman et al. (2018) and Robinson et al. (2019) skip the financial analysis step and proceed directly to the *social* (economic) analysis. However, the financial analysis is an important step for USAID to understand the incentives for participants and the potential for sustainability after donor assistance ends.

**The 2015 CBA Guidelines recommended an integrated approach** that analyzes investments from multiple perspectives, including those of the planned clients and beneficiaries, service providers, governments, financial institutions, and the national economy. The 2015 guidelines did not address the global externality of climate change impacts.

The 2015 CBA Guidelines addressed costs incurred in USAID-funded activities, projects, and programs. They did not address broader costs and benefits to the U.S. economy because the Agency’s mandate is to increase well-being in lower-income countries. International development assistance can benefit U.S. national interests by increasing trade that generates income, employment, and cost reductions; reducing global health and environmental threats, and decreasing violent conflicts and security threats.

However, it would be difficult, time-consuming, and costly to quantify the indirect benefits of a specific USAID activity. That would require comprehensive economic models and data that are unlikely to be available and analyses beyond the scope of a CBA for a relatively small, USAID-funded activity. It may be feasible to do a CBA on some large USAID programs in certain sectors, such as trade facilitation. It is also relatively easy to estimate the benefits of global greenhouse gas reductions from USAID activities because the U.S. Government has set a value for the social cost of carbon dioxide and other major greenhouse gases.

**The 2015 Guidelines thoroughly explained basic CBA modeling and investment criteria and issues.** They followed the Yellow Manual suggestions on discounting for the time value of money, handling inflation and price trends, and using the net present value (present value of net benefits). The guidelines provided detailed instructions on these topics and examples.

**The 2015 CBA Guidelines recommended using commodity-specific conversion factors (CSCFs) for tradable commodities.** These conversion factors reflect the differences between financial prices and economic prices (*shadow prices*) for certain costs and benefits. The Yellow Manual also suggested using commodity-specific conversion factors for non-tradable goods. These factors are country-specific, and the calculations vary depending on whether the commodities can be imported, exported, or are not internationally traded. The formulas also differ for inputs and outputs.

CSCFs can be easily incorporated into a CBA if a country has calculated them and made them publicly available. Unfortunately, only three African countries have websites that list CSCFs (Ghana, Mozambique, and Uganda).<sup>9</sup> If existing CSCFs are not available, it can be time-consuming to estimate them for a specific CBA. CSCFs reflect the effects of taxes, subsidies, and other market distortions. However, these distortions can also be directly addressed in a CBA without using these shadow prices. Over half of the

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<sup>9</sup> <https://national-parameters.mofep.gov.gh/>; <http://parametros-nacionais.mef.gov.mz/>; and <http://national-parameters.ug/> (accessed December 19, 2022).

economic analysis discussion in the 2015 CBA Guidelines dealt with estimating CSCFs for internationally traded commodities.

**The USAID CBA Guidelines also recommended the consumer surplus concept to estimate economic values in the market for nontradable goods and services.** However, the 2015 guidelines did not address the valuation of *non-market* or *extramarket* goods and services, such as public health, education, environmental protection, natural resource sustainability, resilience, democracy and governance, and empowerment and equity, despite their importance in USAID-funded programs.

USAID has already commissioned some work on the valuation of non-market (extramarket) environmental goods and services (Kashi et al. 2018; Smith et al. 2018). EMD recognized this gap in the 2015 Guidelines in developing the scope of work for this assessment and plans to address it in the revised guidelines. Many development assistance organizations have included general valuation methods for extramarket benefits and costs in their general guidance while covering in-depth, sector-specific methods in separate documents.

TABLE 2: TECHNICAL COVERAGE OF VALUATION METHODS IN 2015 USAID GUIDANCE	
Competitive markets: Internationally traded (e.g., farm produce)	Covered in depth
Competitive markets: Not internationally traded (e.g., transport)	Not covered
Non-competitive markets (e.g., most electricity markets)	Lightly covered
Non-market goods and services (e.g., security)	Not covered

**The revised guidelines do not have to recommend a particular approach for estimating and modeling shadow prices.** CSCFs are a robust framework for estimating shadow prices for CBAs in competitive markets. However, they are not the only alternative nor the most common framework. None of the other institutional guidelines reviewed for this assessment recommended using CSCFs. CBA guidelines for many other development assistance organizations, including MCC (2021) and ADB (2017), directed staff to other discussions of recommended practices. Revised USAID Guidelines should acknowledge the Yellow Manual as one of the standard references for CBA practitioners but could also recommend alternative approaches for estimating shadow prices.

## SECTOR-SPECIFIC AND CROSS-CUTTING GUIDANCE

*Sector-specific* guidance can help CBA practitioners understand the issues in applying the tool in particular sectors such as agriculture, water and sanitation, transport, energy, health, and education. *Cross-cutting* guidance can improve the consistency of overarching issues and key analytical parameters across different CBAs. Overarching issues include sustainability, resilience, empowerment, and equity. Examples of key analytical parameters include the valuation of unpaid labor time, the social cost of greenhouse gas emissions, and the value of a statistical life or changes in morbidity rates.

**The 2015 CBA Guidelines did not include much sector-specific or cross-cutting guidance.** Although they included examples for agricultural investments, the current guidelines do not address sector-specific valuation methods, CBA frameworks, or other examples. The 2015 Guidelines were adequate for typical USAID agricultural activities where most inputs and outputs were traded in

competitive markets. More recently, USAID has placed a high priority on climate change mitigation and adaptation, other aspects of environmental and natural resource sustainability, and empowerment and equity for women, indigenous populations, and other marginalized groups. With greater emphasis on these issues, more attention is needed on extramarket valuation in all sectors.

As previously mentioned, USAID has funded contractor reports on CBA or analysis of costs or benefits in a few specific sectors: resilience programming in humanitarian assistance (Schubert 2020), education (Walls et al. 2021), and mangrove valuation (Smith et al. 2018). USAID has also funded cross-cutting reference materials on CBA topics such as the integration of gender (Watt et al. 2017) and ecosystem service values (Kashi et al. 2018).

**Some USAID interviewees with knowledge of CBA requested that the revised guidelines make it easier for Agency staff to apply the tool.** Two key informants expressed the need for further guidance on specific thematic and technical areas. Some interviewees also wanted greater clarity on selecting discount rates, the social cost of carbon, and the value of a statistical life (discussed later in this report). This approach will allow practitioners to focus on the interventions while drawing on parameter values and methods recommended in the Guidelines.

**The 2015 CBA Guidelines recommended specific values of select key parameters,** such as a 12 percent real discount rate in economic analysis. For financial analyses, they recommended using discount rates based on interest rates on loan financing available to the desired participant groups. However, they did not resolve questions of how to deal with multiple conflicting interest rates and financing terms for different periods and from alternative sources or the removal of inflation from nominal interest rates. The Guidelines also encouraged the use of sensitivity analysis to test the effects of other discount rates in economic or financial analysis.

**The 2015 Guidelines also noted the importance of assuming unpaid labor time has an opportunity cost.** They stated that,

“CBA analysts must account for the cost of any labor, whether hired or family, to be used in an investment activity. If the labor market in question functions without significant distortions, wages should be determined by the prevailing market wage for the particular skill set required and the price paid on the market at the time of demand (e.g., demand for semi-skilled harvest laborers).”

This guidance on the opportunity cost of labor has indirect implications for the valuation of changes in time allocations (see section 8).

**In revising the guidelines, USAID can either integrate discussion of sectoral and cross-cutting parameters in the document or refer users to separate knowledge products.** Some multilateral development banks prefer to issue integrated guidance with separate chapters or annexes on technical issues and applications in their major focal sectors (ADB 2017). Other organizations, such as the Millennium Challenge Corporation, have issued separate knowledge products with specific sectoral guidance (MCC 2019).

Both approaches involve trade offs. Integrating more topics into the guidelines can help practitioners find the most relevant information in one place, reducing search efforts to ease time constraints and facilitating consistency with general guidance. However, the integrated approach will make the guidelines longer, and they may appear more daunting to users.

One advantage of standalone knowledge products is that CBA methods are still evolving in many thematic areas and will continue to change with new regulatory requirements, academic research, and practical experience. On balance, the assessment team recommends separate sectoral and thematic guidance to provide greater flexibility without having to update the general guidance as frequently.

**In revising the 2015 CBA Guidelines, USAID should review the experience of other development assistance organizations (particularly MCC) and incorporate more recent research and the evolving expectations for CBAs.** MCC has begun finalizing and publishing its internal cross-cutting and sector-specific CBA guidance. Although MCC and USAID have substantially different operational and financial models and types and sizes of activities, USAID may be able to adapt some of MCC's sector-specific and cross-cutting guidance for CBA. EMD could take the lead in assessing the MCC guidance and consulting with other USAID technical offices about their applicability and need for changes.

## **CBA PRODUCTS, FORMATTING, AND EXAMPLES**

**The 2015 CBA Guidelines included a section on product and editorial guidelines.** This section reflected the importance of documenting the data sources and limitations, assumptions, and results in reviewing, communicating, and building on or replicating the analysis. A complete list of documentation should include

1. A concise description of the intervention being analyzed and the theory of change,
2. List of benefits and costs and the stakeholders involved,
3. Methods used for quantifying the costs and the benefits,
4. Parameter values and their sources,
5. Summary of the results, and
6. Key weaknesses of the analysis.

**The 2015 CBA Guidelines required that a CBA include a methodology report and Excel workbooks but could have provided more details.** These two outputs address five of the six above elements. Revised guidelines could provide a clearer framework to unpack the benefits, costs, and stakeholders. For example, see the CBA Framework in Robinson et al. (2019). One interviewee was concerned that recommendations to report knowledge gaps may be a disincentive for the use of CBA. However, the assessment team considers this to be an important part of a CBA report that increases transparency and provides an opportunity to discuss data gaps and problems that may affect the findings and recommendations. Addressing weaknesses in the analysis can highlight knowledge gaps that can then inform intervention design, monitoring, implementation, evaluations, and other knowledge products.

## **RECOMMENDATIONS**

1. **Encourage a more comprehensive and reusable approach to documenting CBAs.** The 2015 CBA Guidelines identified most of the types of documentation needed to support analysis. However, the revision could devote more attention to specifying detail needed on the costs and benefits, stakeholder perspectives, and highlighting knowledge gaps and weaknesses in reports.
2. **Revised USAID guidelines should focus more on extramarket (non-market) valuation in economic analysis. However, it may be best to avoid being too prescriptive in recommending a particular approach** to estimating shadow prices (such as the CSCF) or the monetary benefits and costs of non-market/extramarket goods and services (except for the

USG's standard approach to valuing the social cost of greenhouse gas emissions). Instead, the revised guidelines can discuss the range of relevant methods for the valuation of goods and services in competitive and non-competitive markets and those that fall outside of markets.

- 3. The revised guidelines can direct practitioners to standard references rather than repeating or simplifying content that is already easily available from other sources.** Reducing the repetition of topics already well covered in other references will allow the revised guidelines to focus on what to do when standard references do not exist, are contradictory, or lack clarity. The revised Guidelines can also highlight gaps or contradictions in the standard references.

Many organizations use CBA knowledge products that complement their general guidelines, including those on sector-specific or cross-cutting topics. The Asian Development Bank (ADB), U.S. Department of Transportation (DOT), MCC, and the World Bank have internal memos, reports, and published guidelines that focus on such topics as

- Value of changes in time allocations;
- Monetization of mortality and morbidity outcomes;
- Selection of the discount rate;
- Social cost of carbon and other greenhouse gases; and
- Standard sources for data on inflation, exchange rates, and per-capita growth rates.

- 4. The revised guidelines would be more informative if it provides examples and references to CBA reports in various sectors by USAID and other development assistance organizations.** Many interviewees reported reviewing some relevant CBAs before starting their own analyses.
- 5. USAID management should consider making the revised guidelines mandatory for CBAs prepared by or for USAID.** CBA guidelines are mandatory for all five development assistance organizations interviewed: MCC, ADB, the African Development Bank (AfDB), and the U.S. Department of Transportation (DOT). Mandatory guidelines can still be designed to provide flexibility. Flexibility may be essential where some USAID offices provide separate CBA guidance that is inconsistent with EMD's guidance.
- 6. Plan for periodically revising the guidelines as the context and use cases evolve.** Whether the guidelines are mandatory or optional, they will require additional reviews and updating later to remain current with academic research and the practical needs of the organization.
- 7. Reinforce EMD's role in developing and maintaining USAID's CBA-related guidance.** EMD reported that it does not have the budget or staff to continually update the Agency's CBA Guidelines. Nevertheless, it should review them periodically as the need arises. It may also be efficient for USAID to keep up with updates of the CBA guidelines of MCC and other development assistance agencies and USG entities. EMD should also consider working with other USAID technical offices on cross-cutting and sector-specific guidance with relevant interests and resources.
- 8. Make the revised guidelines widely available to internal and external audiences and reinvigorate EMD efforts to disseminate them.** In line with recommendations in section 2,



EMD could promote the guidelines together with other efforts to build awareness and capacity of CBA within USAID and with external partners.

## 4. THE DISCOUNT RATE

A discount rate is used to convert costs and benefits in different years to account for the time value of money in a CBA. A zero discount implies indifference between present and future benefits (or costs). A zero discount rate is not generally recommended by economists for a financial or economic analysis.

**Alternative Theories on Discount Rates.** Economists have debated the theoretical justifications for an economic discount rate and the parameters for estimating it for a long time. There are three main viewpoints on the choice of economic discount rate: 1) the opportunity cost of capital, 2) the social rate of time preference, and 3) the cost of government borrowing. The *opportunity cost of capital* reflects the average returns on private investments in an economy. Proponents of this approach include Hirshleifer, De Haven, and Milliman (1969), Baumol (1968), and Atkinson and Stiglitz (2015).

The *social rate of time preference* estimates a society's preferences on the time value of money for public investments and policy decisions. Ramsey (1928) focused on time preferences in consumption and assumed that continuing per capita income growth over time would reduce the marginal utility of income. Marglin (1963) was one of the early proponents of the now prevailing view that a social rate of time preference implies a lower discount rate than the opportunity cost of capital (Dasgupta, Sen, and Marglin 1972; Feldstein 1972; Little and Mirrlees 1974; Ahsen 1980; Warr and Wright 1981; Moore and Vining 2018).

The cost of government borrowing can be used in comparing the benefits of public expenditures to the financing cost for public borrowing of funds. The cost of government borrowing varies frequently and is affected by world economic conditions; domestic government policies, fiscal position, political stability; and currency exchange rates. This approach is less common.

**USG Guidance on Discount Rates.** The USG has used three different levels of discount rates, depending on whether the purpose of the analysis was for 1) domestic investments and regulations, 2) cost-effectiveness or leasing decisions, or 3) Federal water and related land resources planning and investments.

Office of Management and Budget (OMB) Circular A-4<sup>10</sup> pertains to USG regulatory analyses. It noted, "Future citizens who are affected by such choices cannot take part in making them, and today's society must act with some consideration of their interest [...]. A second reason for discounting the benefits and costs accruing to future generations at a lower rate is increased uncertainty about the appropriate value of the discount rate, the longer the horizon for the analysis [...]."

OMB Circular A-4 directed Federal agencies to use discount rates of seven percent and three percent for regulatory analyses, where the seven percent is the real (net of inflation) pre-tax average return on private investment and three percent is the real return received by consumers after taxes (OMB 1992; OMB 2003). OMB Circular A-4 also stated, "[With] important intergenerational benefits or costs you might consider a further sensitivity analysis using a lower but positive discount rate in addition to calculating net benefits using discount rates of 3 and 7 percent." The seven percent rate was said to approximate the marginal pretax rate of return on an average private sector investment and was supposed to be changed in future updates, but it has not been changed.

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<sup>10</sup> <https://www.transportation.gov/sites/dot.gov/files/docs/OMB%20Circular%20No.%20A-4.pdf> (accessed December 19, 2022).

OMB Circular A-94 stated that cost-effectiveness, leasing, and related analyses should use the U.S. Treasury borrowing rate on marketable securities of comparable maturity to the analysis period. Analyses based on future nominal costs should use the nominal Treasury rates, while those in constant-dollar costs should use the equivalent real rates (net of inflation). OMB updates discount rate guidance annually as an annex to Circular A-94.

The Water Resources Planning Act of 1965 and the Water Resources Development Act of 1974 required the Bureau of Reclamation in the Department of the Interior to make an annual determination of the discount rate to be used in Federal water and related land resources planning and investments. Section 80(a) of Public Law 93–251 (88 Stat. 34), and 18 CFR 704.39 required the Bureau of Reclamation to base the discount rate determination for water resources planning on the average yield of marketable, interest-bearing USG securities with a maturity of 15 years or more in the preceding fiscal year, rounded to the nearest 0.125 percent. The law also limits annual increases or decreases to 0.25 percent. This lower rate was deemed appropriate for longer-term investments in large-scale hydropower and flood control impoundments. It was 2.5 percent for FY 2021.

**The economic and financial discount rates.** The discount rate can be different for an economic analysis and a financial analysis. An economic analysis typically takes the perspective of the national economy (impact on Gross Domestic Product -- the total size of the economic pie). The economic discount rate is typically applied in CBAs of international or domestic public investments.

**When CBAs use constant prices, the discount rate is a real rate (net of inflation).** The nominal or market discount rate is higher than the real discount to compensate for the devaluation of the currency. CBAs typically use constant prices (real prices) that are adjusted for inflation. Under such circumstances, the real discount rate is the relevant parameter to reflect the opportunity cost of time.

**CBAs can include financial analysis to assess sustainability measures and incentives from alternative perspectives, such as farmers and other private sector participants.** A financial discount rate differs from an economic discount rate as it reflects the opportunity cost from a particular perspective. A viable approach for finding a financial discount rate for households and smallholders in low-income countries is to find the market interest rates on loans available to them.

**A financial or economic discount rate can be descriptive or prescriptive, and both types can be relevant.** A *descriptive discount rate* is based on observable market interest rates that affect the incentives and process of stakeholder production and consumption decisions. However, capital markets are highly imperfect, especially in developing countries, and there may be ethical considerations associated with equity within and across generations. As a result, a development assistance organization might use a *prescriptive discount rate* in financial or economic analysis based on value judgments on what might produce more optimal decisions. Prescriptive discount rates are often considered lower than descriptive discount rates and can be selected to favor particular types or sectors of investments. The Intergovernmental Panel on Climate Change recommended using a lower prescriptive discount rate for public investments and policy decisions with long-term impacts on the global climate.

However, an alternative application of a prescriptive approach is to set a *hurdle rate* – a higher minimum rate of return on investment than a descriptive discount rate. Businesses and investors often use a financial hurdle rate to maximize their profits. Some development assistance organizations with a business perspective also favor this approach. For example, MCC uses a hurdle rate to make investment decisions with the highest economic returns. A hurdle rate is most appropriate when there is a range of capital-intensive investment alternatives with different streams of future benefits. As the hurdle rate increases, fewer investment alternatives will be economically viable.

The Weighted Average Cost of Capital (WACC) is an alternative approach relevant for corporations or investors that use a mix of debt and equity financing. The weights in the calculation reflect the proportions of debt and equity in the capital stack that would be tapped for the investment. For an analysis of cash flows in constant prices, the WACC would use the real cost of capital (net of inflation) for each source. Nominal loan interest rates have to be adjusted for the projected inflation rate to obtain the real interest rate.

**Some development assistance organizations, governments, or CBA practitioners add a risk premium to financial or economic discount rates.** However, non-concessional market interest rates already include a risk premium. Furthermore, it is preferable to estimate risks outside of the discount rate and include them directly in the cash flow estimates or through other techniques such as sensitivity and scenario analysis, and Monte-Carlo simulations. When risks are analyzed more directly, the discount rate should not include a risk premium.

**Compound interest rates can generate substantial amounts of money over long periods, even relatively low ones. Discounting has the opposite effect. It makes the present value of costs and benefits that are farther in the future very small.** At a 12 percent real economic discount rate, \$1 in 25 years has a present value of just \$0.06, and \$1 in 50 years has a present value of only \$0.003. The same present values at a three percent discount rate are \$0.48 and \$0.23, respectively. A high discount rate places no value on benefits or costs that occur after 28-30 years.

Other complications with discounting over long periods include 1) the fact that descriptive discount rates pertain to relatively short time horizons, 2) long-term benefits and costs affect future generations, raising issues of intergenerational equity, and 3) there is a high degree of uncertainty about long-term costs and benefits (US EPA 2010).

To account for intergenerational equity, one can stop discounting future utility. Even then, as income grows, the Ramsey approach would continue to recommend a positive but small social rate of time preference. Some economists have recommended applying such a lower or declining discount rate for persistent, long-term impacts, such as climate change (Goulder and Williams 2012; Arrow et al. 2013; Pizer and Li 2021; and Giglio et al. 2021). However, there is no consensus on the discount rate for long-term impacts, and this issue remains a major challenge, particularly for environmental and climate change issues (Nordhaus 2013).

**To reduce the diminished weighting of long-term costs and benefits, the UK and France have used discount rates that decline over time. USAID and other USG agencies and major international development assistance organizations have not yet applied declining discount rates.** Table 3 shows the UK Government's discrete schedule of discount rates for different periods. Some economists have proposed hyperbolic discount rates that decrease in each year of the time period according to an exponential formula. Others have proposed using a fixed discount rate for a certain period, such as 20-30 years, to reflect a perceived time preference of current generations, followed by hyperbolic decreases to benefit future generations. However, there is no general consensus on an initial discount rate, the duration of its applicability, or the pattern of discrete or continuous decreases in the discount rate. There are many underlying value judgments, assumptions, and uncertainty, as well as country-specific or global considerations.

TABLE 3. UNITED KINGDOM'S DECLINING DISCOUNT RATES		
Year	Discount Rate (standard)	Discount Rate (health impacts)
0 - 30	3.5%	1.50%
31 - 75	3.0%	1.29%
76 - 125	2.5%	1.07%

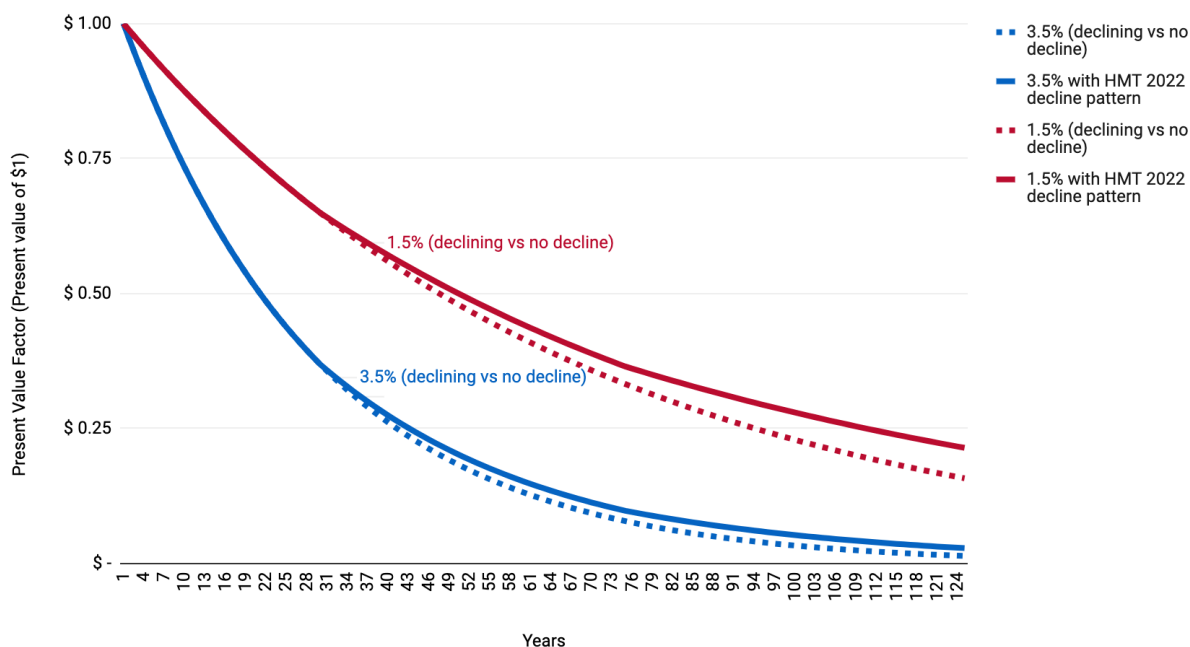
SOURCE: HM Treasury (2022)

Hyperbolic discounting is rooted in behavioral economics and suggests that societal time preferences can change over time. Before the more recent attention to the effects of discount rates on long-term climate and other environmental impacts, some economists had even proposed a Ramsey discounting framework with hyperbolic increasing discount rates based on the assumption of continuing increases of per capita GDP over time, an assumption that some economists now debate. A recent application of Ramsey discounting for the Resources for the Future estimate of the global social cost of carbon allowed for increases and decreases in per capita GDP over time, along with random variations in a Monte Carlo Analysis (Rennert et al. 2022).

Cropper et al. (2014) recommended that the USG could consider using declining discount rates and prepared an illustrative visual comparison of four declining discount rate schedules. However, they found that some potential declining discount rate schedules might decrease so slowly that it would not result in a significant change compared to a flat discount rate.

Figure 4 shows the present value of \$1 using four discounting schedules: 1) a flat discount rate of 3.5 percent, 2) a flat discount rate of 1.5 percent, 3) the HM Treasury (2022) declining discount rates for health, and 4) the HM Treasury (2022) declining interest rates for other sectors. When the starting discount rate was 3.5 percent for non-health impacts, the HM Treasury (2022) declining discount rate schedule doubled the present value factor for the 125th year. Similarly, applying the HM Treasury declining pattern on the 1.5 percent flat will increase the 125th year's present value factor by 36 percent. However, these increases were small compared to the effects of changing the initial discount rate. Reducing the initial discount rate from 3.5 percent to 1.5 percent increased the present value factor for the 125th year by more than tenfold. HM Treasury concluded that further adjustments to the discount rate were not justified and analysts can address valuation gaps "through relative price adjustments and the uprating of values over the appraisal period" (HM Treasury 2021).

**FIGURE 4: Present Value Factors With Declining and Flat Discount Rates Used by the U.K. Government**



**USG has used different discounting policies in CBAs of regulatory and investment decisions.** Table 4 summarizes the discount rate policy and experience at four USG agencies.

The assessment team collected information about the discount rate policy at four USG Agencies -- the Millennium Challenge Corporation (MCC), U.S. Department of Transport, U.S. International Development Finance Corporation (DFC), and the U.S. Trade and Development Agency (USTDA). MCC uses CBA as an important part of its investment approval process. MCC previously used a 12 percent standard discount rate but has reduced it to 10 percent.

DFC often asks applicants to submit financial analyses as part of its due diligence process but allows them to use their formats and parameters. DFC's internal social and environmental review process does not require economic CBAs with discounted costs and benefits. Instead, it has its multicriteria impact analysis framework, the DFC Impact Quotient. The DFC Impact Quotient uses a mix of qualitative and quantitative indicators to produce a score summarizing the project's developmental, inclusion, and innovation outcomes (DFC 2022).

USTDA focuses on the U.S. export potential as the main benefit of its projects and does not require discounting future export when adding up the export potential's monetary value over the project's life (USTDA 2022).

TABLE 4. DISCOUNT RATE POLICY AND PRACTICE AT FOUR USG AGENCIES		
Organization	Discount Rate Policy	Practice
<b>Millennium Challenge Corporation</b>	Uses a real rate of 10 percent for all investments (MCC 2021).	MCC began an internal review of its discount rate practices in 2021 and consulted with an external advisory committee of economists. In mid-2022, it was still deliberating possible changes in the discount rate.
<b>U.S. Department of Transport</b>	Seven percent real discount rate for discretionary grants. Follows OMB guidance for using seven percent and three percent in regulatory impact analyses.	A three percent real discount rate can be applied to all analyses if the analyst can justify that impacts are large enough to affect consumer choices (interviewee).
<b>U.S. International Development Finance Corporation</b>	DFC does not require discounting future benefits and costs (DFC 2022).	Not applicable
<b>U.S. Trade and Development Agency</b>	USTDA does not require discounting future benefits (USTDA 2022).	Not applicable

Table 5 summarizes four multilateral development banks' discount rate policies and practices and the European Commission's analyses for member countries.

TABLE 5. DISCOUNT RATE POLICY AND PRACTICE AT FOUR MULTILATERAL DEVELOPMENT BANKS AND THE EUROPEAN COMMISSION		
Organization	Discount Rate Policy	Practice
<b>African Development Bank</b>	12 percent real discount rate, but can be reduced depending on the maturity of the country's capital market	All economic analyses in 2021 used the 12 percent discount rate, none used a higher rate (interviewee)
<b>Asian Development Bank</b>	Real discount rate of nine percent in general, but a six percent rate can be pre-approved for social sector projects (poverty reduction and environmental protection). Other country-specific rates can be justified if pre-approved for the whole country (ADB 2017).	If a country uses a <u>higher</u> discount rate than nine percent, the higher rate is used (interviewee)

**TABLE 5. DISCOUNT RATE POLICY AND PRACTICE AT FOUR MULTILATERAL DEVELOPMENT BANKS AND THE EUROPEAN COMMISSION**

Organization	Discount Rate Policy	Practice
<b>European Commission (Member Countries)</b>	Country-specific social rate of time preference as the social discount rate when available. If not available, the default is a three percent real rate. Allows declining discount rates for projects with intergenerational benefits (Sartori and Marra 2021)	Discount rates ranged from 8.13 percent for Estonia to 0.80 percent for Italy (Sartori and Marra 2021)
<b>Inter-American Development Bank</b>	12 percent real rate for all investments, sensitivity tests allowed when dealing with a long time horizon (IADB 2022).	Deviations from this policy are allowed when clear justification is provided. A study (Moore, Boardman and Vining 2020) explored the possible use of country-specific rates, but the practice has not changed
<b>The World Bank</b>	Currently no official discount rate guidance. A recent pre-decisional internal document recommended a real discount rate of 6 percent, but this has not been adopted	Assessment team review of 14 project appraisal documents (PADs) with CBA results published between May and July of 2021 found real discount rates ranging from five to 15 percent, varying with the sector or type of project (see <a href="#">Annex B</a> )

**There are alternative approaches** to address the issues of intergenerational equity when discounting future benefits and costs:

- Reducing the standard discount rate for all economic analyses,
- Using a lower discount rate for projects with long-term benefits and costs,
- Using a declining discount rate schedule, and
- Pricing the short-term outputs or effects that drive the long-term costs and benefits.

## DISCOUNT RATES USED BY USAID

**The 2015 CBA Guidelines recommended a 12 percent discount rate for the base case in economic analyses.** Following a review of discount rates used by the World Bank, Asian Development Bank, Inter-American Development Bank, and Millennium Challenge Corporation in 2014, the USAID CBA Guidelines recommended a 12 percent real (inflation-adjusted) discount rate for economic analyses. However, the use of this discount was optional, like the other recommendations in these guidelines.

The 2015 Guidelines noted that it might not be appropriate to use the 12 percent discount rate in economic analyses for all sectors and encouraged sensitivity analyses to show the effects of other discount rates. They acknowledged that a 12 percent discount rate might be more applicable for infrastructure and agricultural investments and less appropriate for investments with “very long benefit streams,” such as health and climate change. CBAs prepared or managed by the Economic Policy Office (and its successor EMD) applied the 12 percent real discount rate in economic analyses of agriculture, energy and infrastructure, and the environment and climate change. Recent CBAs on the environment and climate change also included sensitivity analyses at discount rates of three and seven percent.



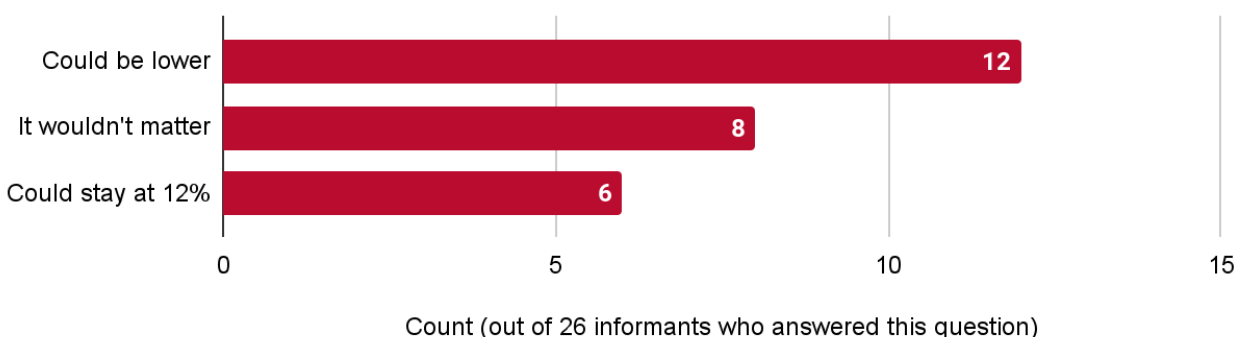
The 2015 Guidelines recommended a different discount rate in financial CBAs based on the cost of loan financing available to the participants expected to make the investments -- the annual percentage rate (APR) based on interest and amortized fees. Since cost-benefit analyses typically use real (inflation-adjusted) discount rates and estimates of future costs and benefits, the component of the nominal interest rate that reflects the projected inflation rate should be removed to calculate the real financing cost.

**USAID-funded CBAs in other sectors have used lower discount rates in economic analyses.**

CBAs prepared for the USAID Bureau for Global Health after 2015 have used economic discount rates from five percent (Budgell et al. 2018; Schnippel et al. 2015) to zero percent (Meyer-Rath et al. 2017). Since the 2015 Guidelines were not mandatory, USAID Economists anticipated the use of different discount rates in other sectors and did not view that as a problem.

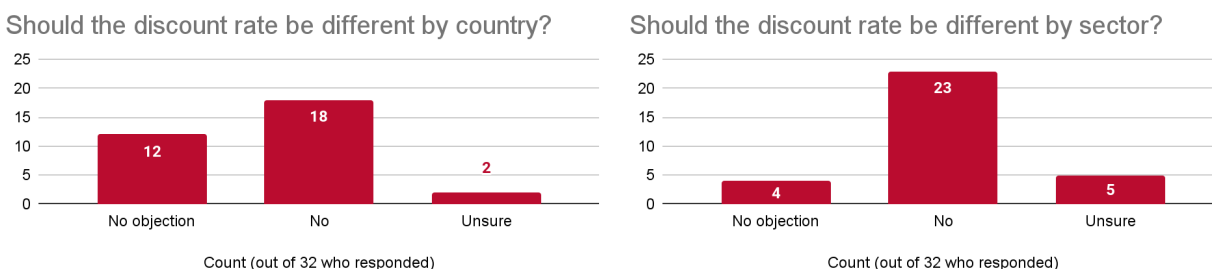
**USAID interviewees had varying opinions about changing the discount rate in the CBA Guidelines.** Twelve of the 26 USAID interviewees thought the Agency should reduce its standard discount rate for economic analyses to align with other international development assistance organizations or promote intergenerational equity. Eight USAID interviewees argued that CBA findings were not usually sensitive to the discount rate. This argument is invalid for projects that trade long-term costs for short-term benefits or vice versa. Six USAID interviewees wanted to retain the 12 percent discount rate recommendation. Two interviewees recommended a fixed discount rate of 12 percent or less, allowing lower rates in special cases when justifiable.

**FIGURE 5: Recommendations for USAID's discount rate policy**



Twelve of the 32 USAID and non-USAID interviewees were open to using different discount rates that varied across countries. However, only four interviewees wanted the discount rate to vary with the investment sector. Other interviewees cited increased complexity in selecting discount rates and the risk that discount rate changes could be used to manipulate the CBA findings. Different discount rates across sectors or countries would make it difficult to compare these CBAs.

**FIGURE 6. USAID and non-USAID Interviewee Views About Changing Discount Rates by Country and Sector**



**USAID and other USG agencies and major development assistance agencies have not yet applied declining or hyperbolic discount rates.** Only one out of the 32 USAID and non-USAID interviewees for this assessment was familiar with the declining or hyperbolic discount rates.

## RECOMMENDATIONS FOR USAID

1. **OMB did not provide specific guidance on discounting for USG international development assistance agencies. However, OMB was considering issuing new guidance on CBAs and discount rates that would apply to all Federal agencies at the time of this report.** Before OMB provides guidance, USAID can choose its approach to discounting, although this might change. If OMB provides no guidance, USAID could consider the following issues on discount rates:
  - a. Relevance for diverse stakeholders in financial analysis;
  - b. The conceptual basis for economic discount rates (descriptive vs. prescriptive; the opportunity cost of capital, social rate of time preference, and cost of government borrowing);
  - c. Methods for estimating the economic discount rate;
  - d. Whether the discount rate should vary across sectors or investments;
  - e. Whether practitioners should have flexibility in choosing discount rates for economic analyses;
  - f. Concerns about adequate consideration of long-term costs and benefits and fairness to future generations; and
  - g. Whether to require sensitivity analyses with multiple discount rates.
2. **The common perspectives for USAID's CBAs, and therefore the relevant discount rates, are the global view or the perspective of the aid-receiving country;** USAID can consider three alternative perspectives in selecting discount rates for economic analyses: 1) an average global discount rate, 2) discount rates adopted by USAID partner countries, or 3) USG discount rates for domestic analyses. Table 6 discusses the advantages and disadvantages of each of these alternatives.

TABLE 6. ADVANTAGES AND DISADVANTAGES OF THREE ALTERNATIVE PERSPECTIVES ON ECONOMIC DISCOUNT RATES		
Perspective	Advantages	Disadvantages
<b>Average global discount rate</b>	<p>Simple for practitioners</p> <p>Allows comparison across USAID interventions</p> <p>When CBA is from a global viewpoint, aligns with the perspective of CBA</p> <p>Aligns with the approach used by most development finance organizations</p>	<p>Unclear how a global average would be calculated and the appropriate weighting of discount rates in different countries</p> <p>Would be less relevant for specific partner countries than their own discount rates</p> <p>The list of USAID partner countries and their proportions of Agency overseas program funds change over time</p>
<b>USAID partner country's own discount rates</b>	<p>Can potentially better reflect the opportunity cost of capital, social rate of time preference, or cost of government borrowing in each partner country</p> <p>When CBA is from a country viewpoint, aligns with the perspective of the CBA</p>	<p>Many USAID partner countries have not set official discount rates or do not make this information readily available</p> <p>Would be subject to change with economic conditions</p> <p>May be based on political, rather than economic conditions</p>
<b>USG discount rates for domestic analyses</b>	<p>Aligns with USG guidance</p> <p>Allows for comparison across all USAID interventions</p>	<p>Under current OMB guidance, there are multiple USG discount rates that pertain to domestic regulatory and investment analyses, leasing decisions, and Federal water and related land use decisions</p> <p>Does not reflect the economic or fiscal conditions in USAID partner countries or their own social rates of time preference</p>

3. **There will never be a theoretical consensus about the correct discount rate for economic analysis.** Economists have debated this issue for a long time, and there is still no agreement today. Issues of intergenerational equity and irreversible environmental impacts add further complexities.
4. **USAID's discount rate does NOT necessarily need to be descriptive.** USAID can choose a discount rate higher or lower than a descriptive discount rate. A higher discount rate is generally considered a higher bar for investments, but it also penalizes the investments that generate net benefits in the distant future. However, there can also be disadvantages to using a low discount rate in financial and economic analyses. If CBA compares alternative technical approaches for a particular activity, discount rates that are too low can lead to economically inefficient investment decisions. Lower discount rates can favor capital-intensive investments over labor-intensive

alternatives and activity designs with high upfront costs and low coverage of operating, maintenance, and replacement costs.

5. **There are technical and institutional trade-offs in changing the discount rate based on the sector of the investment.** USAID cannot change or influence Congressional appropriations across or within sectors and countries through comparative CBAs that try to identify theoretical optimal allocations. However, allowing practitioners to choose a discount rate for each CBA makes the practice less reliable. An alternative approach is for each operating unit to choose its discount rate based on its sector. However, there remain complications when preparing a CBA model for a multisectoral activity that would need to select one of the many discount rates or apply different discount rates to benefit and cost streams in different sectors.

USAID bureaus, offices, and missions have considerable autonomy. Institutionally, it would be difficult to secure buy-in for an Agency-wide mandate to use a single discount rate for all sectors. Attempting to enforce a single uniform discount rate might have a counterproductive effect of further reducing USAID operating unit interest in conducting or supporting CBAs. These practical and institutional trade-offs must be considered in choosing USAID's discount rate policy.

6. **USAID should provide clear guidance on selecting economic discount rates, whether a uniform standard rate or several rates that vary for certain sectors. CBA practitioners should not have to make ad hoc decisions on discount rates.** Some CBA practitioners may be unfamiliar with the various competing theories on discount rates. Many will not understand methods for quantitatively calculating a discount rate. It would be unrealistic to expect them to make these decisions on an ad hoc basis as it can add to the complexity and cost of conducting CBAs. Since there is no consensus in academia or professional practice about the correct discount rate, allowing ad hoc decisions on the discount rate for each CBA may increase the risks that the findings will be intentionally manipulated.
7. **The discount rate policy should address concerns about long-run benefits and fairness to future generations.** At a 12 percent discount rate, the benefits and costs 30 years or more in the future have little or no effect on net present value calculations. There is no consensus on the right approach for addressing this concern. USAID can consider the following options:
  - a. Reducing the standard discount rate for economic analyses,
  - b. Reducing the discount rate in certain sectors,
  - c. Using a declining discount rate over time (discrete schedule or hyperbolic function),
  - d. Requiring sensitivity analysis at a base case discount rate and two alternative standard discount rates, and,
  - e. Shortening the life of the analysis by pricing the short-term outcomes that drive the long-term benefits and costs.

The first three options are mutually exclusive, but the fourth and fifth can be implemented alone or with one of the first three options. Table 7 presents the advantages and disadvantages of these options. While the first four options focus on using a lower discount rate, the fifth option removes the need for applying the discount rate over extended time frames. In most cases, benefits over a

very long time horizon are associated with an output delivered closer to the present time. For instance, the benefits of the averted carbon emissions in 10 years are realized over the following decades. From a CBA standpoint, these benefits can enter the model in two ways:

1. in the form of a price (social cost of carbon) in Year 10, or
2. in the form of the benefits such as reduced climate events from Years 11 to 125 (for illustrative purposes).

The first approach uses a price or set of prices, which could theoretically depend on an underlying discount rate, be derived from markets, or be simply prescribed to promote a policy objective. In either case, this approach removes the need to apply a discount rate over a long timeframe while allowing the intergenerational impacts to enter the calculations meaningfully. An example of this approach is the current USG policy for intergenerational impacts of GHG emissions, where OMB publishes price series for the social cost of GHGs to analyze domestic projects and regulations.

A discount rate different from the CBA's can be among the parameters for calculating the price of a short-term outcome. Using different discount rates in one CBA is a sign of inconsistency. However, so is the use of different discount rates based on the intervention sector or discount rates far below descriptive discount rates. Compared to other approaches, in this approach, 1) the lower discount rate directly applies to the benefits of a specific type, irrespective of the intervention's sectors, and 2) the CBAs are simplified by having a shorter timeline, removing the need for valuing complex benefits. The weakness of this approach is that USAID, or USG, would need to provide the price (or set of prices). Other disadvantages of this approach are similar to other methods used by practitioners for making long-term benefits count.

<b>TABLE 7. ADVANTAGES AND DISADVANTAGES OF OPTIONS FOR VALUING LONG TERM BENEFITS AND COSTS</b>		
<b>Option</b>	<b>Advantages</b>	<b>Disadvantages</b>
<b>Reducing the standard discount rate for economic analyses</b>	<p>Will give more weight to future benefits and costs in all sectors</p> <p>Consistency with OMB guidance for USG domestic investment and regulatory decisions</p>	<p>Reducing the standard discount rate from 12 percent to three or seven percent will decrease, but not solve concerns about intragenerational and intergenerational equity and long-term climate and environmental impacts</p>
<b>Reducing the discount rate in certain sectors</b>	<p>Will give more weight to future benefits and costs in sectors that have a long time horizon or raise greater ethical concerns</p> <p>Consistent with the practice in some academic research and other development assistance organizations</p>	<p>There may be internal controversy over which sectors or impacts are analyzed at lower standard discount rate</p> <p>Can distort the allocation of resources across sectors if used in budgetary decisions (not applicable for USAID)</p>

**TABLE 7. ADVANTAGES AND DISADVANTAGES OF OPTIONS FOR VALUING LONG TERM BENEFITS AND COSTS**

Option	Advantages	Disadvantages
<b>Using a declining discount rate (discrete schedule or hyperbolic function)</b>	<p>Will give more weight to future benefits and costs in sectors that have a longer time horizon or raise greater ethical concerns</p> <p>Effects on the net present value will depend on the magnitude and timing of the resulting decreases in the discount rate</p>	<p>There are multiple parameters at play and the conceptual basis for a discrete schedule is unclear</p> <p>Few USAID staff and partners are familiar with the concept, which can be complicated to apply if multiple parameters are included in the formula</p> <p>The starting discount rate has a more important role in the value of future benefits than the decline pattern</p>
<b>Requiring sensitivity analysis at a base case discount rate and two alternative standard discount rates</b>	<p>Sensitivity analysis can decrease over-reliance on CBA results at a single discount rate</p> <p>Rationale is relatively easy to understand and simple to implement in a spreadsheet</p>	<p>Still have to specify a base discount rate and the sensitivity analysis discount rates</p> <p>CBA findings may be more complicated to interpret when multiple other parameters are also varied in sensitivity analyses, increasing the number of possible combinations</p>
<b>Shortening the life of the analysis by pricing the short-term outcomes</b>	<p>Simplifies CBAs by shortening their timeline and removing the need for valuing complex benefits</p> <p>Directly applies to the benefits of a specific type</p> <p>Aligns with some of the current USG policies such as the social cost of GHG emissions</p>	<p>USAID, or USG, would need to provide the price (or set of prices)</p>

**Regardless of how USAID approaches discounting in CBA, revised guidelines should clearly articulate the rationale for the recommended approach.** Practitioners should explain the implications of the discount rate selection in CBA reports.

- 8. The recommendations for financial analysis must clarify the definition of a market rate as the starting point.** In some cases, the inflation adjustment may result in a negative, real discount rate in a financial analysis, particularly if interest rates are regulated by the government, subsidized by a development assistance organization, or when projected inflation rates are high. As a rule of thumb, analysts should refrain from considering such regulated rates as a basis for estimating a financial discount rate for low-income households or farmers. Suppose a loan's interest rate is lower than inflation. In that case, it is a concessional loan tied to a particular investment (not available for general borrowing) and is not a market rate.

## 5. SOCIAL COST OF GREENHOUSE GASES

**Climate change impacts and costs are not evenly distributed across countries and regions.** Some areas are likely to experience higher increases in average temperatures than global averages. Changes in precipitation and wind and storm patterns are also variable and harder to predict with general circulation models than temperature changes and are not available at local scales.

**In 2014, Executive Order 13677 on Climate-Resilient International Development required Federal agencies to assess climate-related risks for all investments (with some limited exemptions) and adopt climate risk management measures as needed.** In response, USAID required climate risk management in the design and implementation of projects, activities, and Regional and Country Development Cooperation Strategies. USAID developed a mandatory process and screening tool for climate risk screening of all proposed activities.<sup>11</sup> Executive Order 14008 of 2021 addressed “Tackling the Climate Crisis at Home and Abroad.”

**The climate-specific requirements are in addition to the environmental impact screening and assessment requirements under the National Environmental Policy Act of 1970 and the Council on Environmental Quality’s implementing regulations.** Federal Agencies can approve categorical exclusions for activities unlikely to have significant negative or positive environmental impacts based on the 22 CFR 216.2(c) definitions.

**ADS 201 requires USAID staff to prepare an Initial Environmental Examination (IEE) or a Request for a Categorical Exclusion in the design stage of every activity.** Categorical exemptions can be approved for analyses, studies, academic or research workshops, and meetings; projects in which USAID is a minor contributor to a multi-donor project; education, technical assistance, and training programs that do not directly affect the environment.

**These documents have to be approved by the bureau or mission environmental officers.** Activities that have the potential for significant environmental impacts require a more comprehensive Environmental Assessment (EA). If the environmental impact review process has identified the need for mitigation measures, USAID staff prepare an Environmental Mitigation and Monitoring Plan (EMMP). If concerns have been raised about greenhouse gas emissions, an EMMP can require the identification of baseline emissions and estimation or monitoring of the emissions over the lifetime of the activity.

**In 2021, OMB issued guidance for Federal agencies on international energy engagement that restricts investments in carbon-intensive energy projects that exceed a minimum threshold of greenhouse gas emissions.** The guidance allows exemptions for national security or fragile and conflict-affected states.<sup>12</sup> USAID established an internal review process for considering exemptions in 2021. All Federal agencies are required to report to OMB annually on approved exemptions. In September of 2022, USAID issued new policy guidance and templates for approval of exemptions for support of fossil fuels and other carbon-intensive investments as mandatory references to ADS 201.

**Executive Order 13990 of January 20, 2021, required USG agencies to include the social cost of greenhouse gas (SC-GHG) emissions in their economic analyses, including CBAs and CEAs.** When Federal agencies assess the potential costs and benefits of regulatory actions in compliance with Executive Order 12866 of 1993, they must use the latest SC-GHG estimates to monetize increases

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<sup>11</sup> <https://www.usaid.gov/sites/default/files/2022-12/201mal.pdf> (accessed December 20, 2022).

<sup>12</sup> <http://priceofoil.org/content/uploads/2021/12/US-Fossil-Fuel-Guidance-December-2021.pdf> (accessed December 19, 2022).

or decreases in greenhouse gas emissions resulting from regulations and other agency actions. Agencies only have to submit a regulatory impact analysis for regulatory actions that are “significant” (under E.O. 12866) or “economically significant” (under OMB Circular A-4). When another applicable statute expressly specifies or requires a CBA and does not dictate a specific approach to CBA, the agency must make its methodological choices (including any use of the 2021 interim SC-GHG estimates) available for public notice and comment.<sup>13</sup>

**OMB has not yet addressed requirements for using the SC-GHG values in optional CBAs that support Federal agency investment decisions or evaluations, but that would be consistent with the intent of E.O. 13990.** Although OMB declined to be interviewed by the assessment team, two of their staff informed an EMD staff person that they planned to revise the broader guidance on CBA for Federal agencies in Circular A-94 and that this is expected to encompass the SC-GHG.

**Executive Order 13990 established an Interagency Working Group on the Social Cost of Greenhouse Gases (IWG SC-GHG) to set interim values for the social costs of carbon (SC-CO<sub>2</sub>), methane (SC-CH<sub>4</sub>), and nitrous oxide (SC-N<sub>2</sub>O) in 2021 and subsequently revise them following in-depth analysis.** The revised preliminary values were a simple inflation adjustment of 2013 estimates in 2016.<sup>14</sup>

**The Interagency Working Group is expected to replace the interim estimates with more rigorous values in 2022, based on more recent scientific research and new and more comprehensive modeling.** OMB plans to issue guidance on the use of these social cost estimates that will apply to USAID. The revised USAID CBA Guidelines will require the application of these costs, subject to further changes in later years.

**The USG’s interim social cost estimates address the global costs of GHG emissions through the year 2300. Since they are present values, they are sensitive to the discount rate. They are disaggregated to reflect differences in the relative global warming potential of the various greenhouse gases.** The global warming potential of a greenhouse gas reflects differences in its atmospheric heating effects and persistence in the atmosphere relative to carbon dioxide. By definition, carbon dioxide has a global warming potential of one. The global warming potential of methane and nitrous oxide is considerably higher than that of carbon dioxide.

**The Interagency Working Group calculated the global social costs at three discount rates—2.5, 3.0, and 5.0 percent.** Their base case estimates were at the 3.0 percent discount rate and are the guidance levels for USG agencies. The cost estimates increase every five years after 2020 because climate impacts and economic costs increase with cumulative net emissions.

**At the 3.0 percent discount rate, the preliminary social cost per metric ton of carbon dioxide emitted was \$51 in 2020, increasing to \$85 in 2050.** The social cost of methane was \$1,500/t in 2020, increasing to \$3,100 in 2050. Nitrous oxide had a social cost of \$18,000/t in 2020 and \$33,000/t in 2050. The revised USG estimates in 2022 are expected to be higher than the preliminary estimates.

**Other estimates of the global social cost of carbon dioxide are considerably higher than the interim USG values.** Pindyck (2019) consulted with experts who estimated an average global social

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<sup>13</sup> <https://www.whitehouse.gov/wp-content/uploads/2021/06/Social-Cost-of-Greenhouse-Gas-Emissions.pdf> (accessed December 19, 2022).

<sup>14</sup> [https://www.epa.gov/sites/default/files/2016-12/documents/sc\\_co2\\_tsd\\_august\\_2016.pdf](https://www.epa.gov/sites/default/files/2016-12/documents/sc_co2_tsd_august_2016.pdf) (accessed December 19, 2022).



cost of \$200/tCO<sub>2</sub> and noted that the average was \$80-\$100/tCO<sub>2</sub> when outliers were excluded. Integrated assessment models (IAM) such as those used by the IWG SC-GHG may underestimate the social cost of greenhouse gases SC-C because they do not account for potential catastrophic outcomes, nonlinear feedback loops, or tipping points. Ricke, Drouet, Caldeira and Tavoni (2018) considered these nonlinear effects and estimated a global social cost of \$417/tCO<sub>2</sub>.

**Rennert et al. (2022) estimated a global social cost of \$185/tCO<sub>2</sub> through the year 2300 based on a two percent discount rate adjusted inversely with projected trends and random variations in average per capita income.** This base case value is so high that it would make most carbon-intensive investments economically nonviable. They also conducted sensitivity analyses at a three percent discount rate and several others below two percent. The social cost of carbon was quite sensitive to the discount rate assumption.

**Rennert et al. (2022) applied Monte Carlo simulations to population and economic growth projections, GHG emission factors, and economic damage estimates.** They also disaggregated the social costs of carbon by type of impact. Most of the negative climate impacts were on agriculture and human health, and air pollution from fossil fuels was the main driver of the health impacts. The authors used a benefit transfer approach to extrapolate the value of a statistical life in each country based on per capita GDP relative to the U.S. and an income elasticity of demand of one (which their Resource for the Future colleague Maureen Cropper considered too high in a discussion of the report). However, they 1) did not account for the net benefits of climate adaptation investments that would reduce the social cost of carbon, 2) used a nonstandard, low estimate of the Global Warming Potential of methane, and 3) placed no value on climate impacts on biodiversity.

## ISSUES, OPTIONS, AND TRADEOFFS

**In the revised CBA guidelines, USAID should adopt the latest available base case estimates of the Interagency Working Group.** The current preliminary estimates are expected to be revised soon, and further revisions are anticipated in later years. USAID will need to establish a regular process of promptly adopting the updated estimates when they are revised.

**Some USAID activities have little or no foreseeable impact on greenhouse gas emissions.** For example, it would not be feasible to estimate changes in GHG emissions from general USAID support for democracy and governance, economic policy reforms, or financial inclusion. This is not an issue because USAID does not prepare CBAs for these activities. If it did, uncertain second-order effects on emissions would not be included for lack of data.

**USAID investments can increase or reduce GHG emissions depending on the sector and context.** For example, investments that expand fossil fuel or large-scale hydropower generation, road construction, infrastructure, mining, logging, and agriculture (particularly ruminant livestock and paddy rice production) can increase GHG emissions (Smith, Cooley, and Hyman 2018; Manion et al. 2019; N’ganga et al. 2020). Investments in climate-smart agriculture; agroforestry, renewable energy; reforestation; and restoration of forests, mangroves, coral reefs, and seagrasses can reduce GHG emissions (Belova et al. 2015; Narayan et al. 2017; Cooley et al. 2021; Matek et al. 2021a and 2021b).<sup>15</sup>

**The documents produced for USAID’s environmental and climate risk screening and carbon-intensive energy exemption approval processes in the activity design stage can help identify whether a proposed activity may substantially increase or reduce GHG emissions.**

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<sup>15</sup> <https://agledx.ccafs.cgiar.org/> (accessed December 19, 2022).

USAID can easily place a monetary value on the potential impacts by applying the USG's SC-GHG values. However, USAID activities are often not fully designed in the approval and procurement stages. More detailed identification of specific interventions often does not occur until work plans are prepared in the implementation stage after USAID awards a grant or contract. As a result, the projected negative or positive impacts on GHG emissions may be more accurately assessed in implementation rather than activity design.

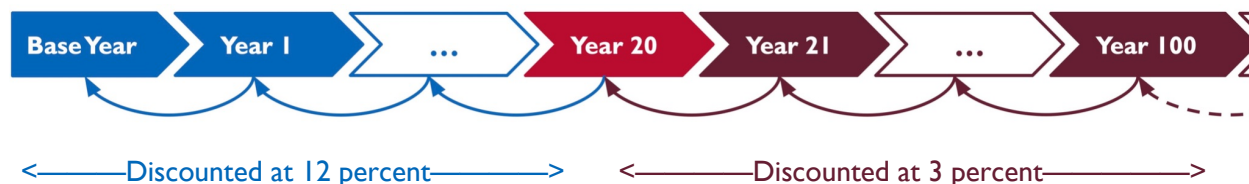
**USAID should monitor substantial negative or positive impacts on GHG emissions and value them at the USG's social cost whether or not USAID conducts a full CBA.** USAID investments in some sectors are more likely to have negative or positive impacts on GHG emissions than others; for example, nonrenewable energy, transportation, infrastructure, forestry, and agriculture (particularly ruminant livestock and paddy rice).

### DISCOUNTING AND THE SOCIAL COST OF GREENHOUSE GAS EMISSIONS

The interim USG base case estimates of the SC-GHG used a three percent discount rate in calculating the present value of the global economic losses from GHG gas emissions through the year 2300. The USG also estimated the SC-GHG at discount rates of 2.5 percent and 5.0 percent (IWG SC-GHG 2021). These three discount rates are lower than the 12 percent discount rate for economic analysis recommended in the 2015 CBA Guidelines. Using these SC-GHG values in a CBA that uses a discount rate of 12 percent implies that two different discount rates are in the analysis.

Figure 7 shows how the two different discount rates would apply in a hypothetical example where carbon dioxide emissions increase 20 years after a USAID investment that boosts long-term economic growth. In the base case, the SC-CO<sub>2</sub> discounts the global emission costs through 2300 to year 20 at the 3.0 percent discount rate. The present value of the SC-CO<sub>2</sub> in year 20 still has to be discounted to year 0. This can be done at the 12 percent recommended USAID discount rate for economic analysis without raising theoretical concerns since the SC-GHG can be treated as a shadow price.

**FIGURE 7. Discounting the Social Cost of Carbon Dioxide**



In this example, the interim base case social cost in 20 years (2040) is \$73 per metric ton of CO<sub>2</sub> (IWG SC-GHG 2021). Discounting this cost from year 20 to year 0 results in a present value of \$20/tCO<sub>2</sub>. This example does not involve any incorrect double discounting of the same cost. However, it is a simplification because it is more likely that CO<sub>2</sub> emissions will increase soon after the investment and continue for many years.

**Some USAID EMD staff have raised questions about the inconsistency of using the USG's interim base case SC-GHG values derived from a 3.0 percent discount rate along with a higher recommended discount rate for other economic costs and benefits or possible double discounting of the total social costs of greenhouse gas emissions.** The assessment team does not view using two different discount rates as a conceptual problem for USAID CBAs. It would be acceptable for USAID to use the price for SC-GHG, irrespective of the underlying theory or markets that have

produced it. The lower discount rates built into the SC-GHG estimates can be justified based on intergenerational equity. If OMB requires all Federal agencies to use the base case SC-GHG values, it would not be viable for USAID to adjust them to account for the difference in the discount rate.

#### Insights from Interviewees

- A non-USAID economist stated, “The expected future damage of climate change may make future generations worse off than the current generation, which makes it important to have a lower discount rate for intergenerational equity.”

**USAID could apply a lower discount rate to convert the total social costs of GHG emissions in future years to present values to address intergenerational equity concerns.** Alternatively, USAID could reduce its current recommended discount rate for all economic benefits and costs to increase consistency with the discount rates used in domestic USG economic analyses while promoting intergenerational equity. Another alternative would be for USAID to keep its current relatively high recommended discount rate and require sensitivity analyses at lower discount rates.

**USAID could consider adopting the three percent discount rate or another rate below 12 percent in revised CBA guidelines.** In the future, OMB may issue new guidance for all Federal agencies on discount rates for CBAs in general or present value calculations for the total social costs of greenhouse gases in future years.

#### FUTURE UPDATES

**The US IWG SC-GHG is expected to revise its estimates of the social costs of greenhouse gases in 2022. The USG plans to continue updating these estimates in the future.** The scientific and economic data underlying the estimates and the integrated models used in the projections will continue to be updated. USAID should adopt revised estimates promptly after the USG produces them.

**CBA is likely to continue to be an optional tool at USAID.** However, revised guidelines should require using the SC-GHG when new CBAs are prepared on investments that are expected to increase or decrease greenhouse gas emissions substantially. USAID may also want to consider whether a quick revision of any completed CBAs to include the SC-GHG would provide useful lessons for future programming.

#### INSTITUTIONAL CONCERNS

**CBA use is optional at USAID.** Accounting for the SC-GHG would make economic net present values less favorable for investments that increase GHG emissions and more favorable for investments that reduce or sequester emissions. In theory, this could make USAID less likely to be interested in supporting a CBA on GHG-intensive investments and increase interest in CBA for climate change mitigation. In practice, it is unlikely that either would make much difference in the constraints that limit CBA use at the Agency. There are larger constraints on increasing USAID use of CBA, including staff and partner capacity, cost and time requirements, the broad and diffuse nature of most USAID activities, and the general designs of activities in the approval and procurement stages. Furthermore, USAID has other review and approval processes that are disincentives for supporting GHG-intensive activities.

**USAID staff and partners will need data to project changes in GHG emissions with alternative interventions, but it will be easier in sectors with existing tools and resources.** USAID already funded the development of a simple AFOLU Carbon Calculator to estimate the CO<sub>2</sub> emissions associated with agriculture, forestry, and land use decisions.<sup>16</sup> USAID is currently supporting further refinement of the AFOLU Carbon Calculator. The U.S. EPA and U.S. Department of Energy have published average emission factors for CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O from various fuels and energy sources online.<sup>17</sup>

**When intervention-specific emissions projections are not available, an Intergovernmental Panel on Climate Change (IPCC) database offers standard (tier I) emission factors for various economic activities.**<sup>18</sup> IPCC also provides country-specific averages for GHG emissions from electric power plants based on the national generation mix.<sup>19</sup>

### Insights from Interviewees

- A USAID economist noted, “The market value of ruminant livestock in developing countries is low relative to the cost of their associated methane emissions.”
- Since CBA is optional at USAID, a requirement to include the SC-CH<sub>4</sub> in economic analyses of ruminant livestock could be a disincentive for conducting a CBA even though one could be useful in improving the design of the interventions (such as feed modification, supplements to reduce methane emissions or promoting nonruminant livestock alternatives).

**USAID could consider requiring an economic analysis for some activities in sectors likely to substantially increase or decrease GHG emissions, as identified in the environmental review or climate risk screening processes.** A CBA can help improve the design of the interventions and associated GHG emissions and understand the trade-offs between near-term income gains benefits and long-term climate-related costs. USAID could set a minimum budget amount or threshold for GHG emission changes that would make an economic analysis necessary.

## RECOMMENDATIONS

1. **EMD will need to track changes in USG SC-GHG estimates and OMB guidance on CBA methods for Federal Agencies and update the CBA guidelines accordingly.** The Interagency Working Group is expected to revise the interim SC-GHG estimates in 2022. OMB plans to issue new guidance on Federal Agency CBAs, including the discount rate issue.
2. **The revised USAID CBA guidelines should require the inclusion of the social cost of GHG emissions whenever USAID prepares or funds CBAs on interventions with negative or positive impacts on emissions over the business-as-usual case.** The guidelines must comply with Executive Order 13990 and any subsequent OMB guidance on CBA,

<sup>16</sup> <http://afolucarbon.org/> (accessed December 19, 2022).

<sup>17</sup> [https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors\\_mar\\_2018\\_0.pdf](https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf); <https://afdc.energy.gov/data/> (accessed December 19, 2022).

<sup>18</sup> <https://www.ipcc-nggip.iges.or.jp/EFDB/main.php> (accessed December 19, 2022).

<sup>19</sup> [https://unfccc.int/sites/default/files/resource/Harmonized\\_Grid\\_Emission\\_factor\\_data\\_set.xlsx](https://unfccc.int/sites/default/files/resource/Harmonized_Grid_Emission_factor_data_set.xlsx) (accessed December 19, 2022).

cost analysis, or GHG accounting.

3. **USAID should consider whether the revised guidelines require or recommend preparing a CBA when interventions are expected to increase or decrease GHG emissions substantially. If USAID decides to require or recommend a CBA in these cases, it should set clear thresholds for the minimum size of the increase or decrease in GHG emissions that would activate this requirement or recommendation.** If CBA use remains optional, a low threshold for accounting for the social cost of GHG emissions could be an additional disincentive for preparing a CBA. However, it is unlikely that this would be a major constraint. Currently, USAID can set its thresholds for GHG impacts that would trigger a requirement or recommendation for a CBA on an investment. However, this may change if OMB issues new guidance on CBA or accounting for the social cost of GHG emissions or the social benefits of emission reductions.
4. **Even if USAID does not require or recommend a full CBA when a GHG impact threshold is exceeded, the Agency could easily apply the SC-CO2 to its existing standard indicators on carbon dioxide equivalent emission reductions from clean energy and sustainable landscape activities.** USAID and the Department of State have common Standard Foreign Assistance Indicators used in annual performance monitoring and reporting.<sup>20</sup> The two agencies agree on the standard indicators for each fiscal year as the list of indicators, and definitions are frequently changed.

There are currently standard foreign assistance indicators on annual and projected future GHG emission reductions for two funding streams -- clean energy and sustainable landscapes. These indicators could be expanded to include other types of activities.

- a. GHG emissions, estimated in metric tons of CO2 equivalent (CO2e), reduced, sequestered, or avoided through clean energy as supported by USG assistance (EG. 12.6)
- b. Projected greenhouse gas emissions reduced or avoided through 2030 from adopted laws, policies, regulations, or technologies related to clean energy as supported by USG assistance (EG. 12.7)
- c. GHG emissions, estimated in metric tons of CO2 equivalent, reduced, sequestered, or avoided through sustainable landscapes activities (EG. 13.6)
- d. Projected greenhouse gas emissions reduced or avoided through 2030 from adopted laws, policies, regulations, or technologies related to sustainable landscapes (EG. 13.7)

There have been difficulties in getting partners and USAID operating units to report these indicators, especially USAID-funded activities asked to monitor all relevant standard indicators and report them quarterly or annually, although many have not yet done so for the GHG emission reduction indicators. In particular, there have been difficulties in reporting the projected emissions changes over a future multi-year period.

In their Annual Performance Plans and Reports (PPRs), USAID missions and other operating units report the indicators by activity and funding stream and roll them up across all funding streams. If

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<sup>20</sup> <https://2009-2017.state.gov/f/indicators/index.htm> (accessed December 19, 2022).

USAID-funded activities and missions and other operating units report annual or projected GHG emission reductions, it should be easy to value these impacts at the USG's social cost values, but that would be a new step in the PPR process, which is overseen by USAID technical sector offices and the PPL Bureau.

**5. USAID staff and partners may find it difficult to project changes in GHG emissions from the business-as-usual case, but this will be easier in some sectors than others.**

USAID staff and partners often look to existing information sources and examples when undertaking climate risk screenings, economic analyses, activity monitoring, and evaluations. Historically, impacts on GHG emission effects have rarely been documented in USAID sectoral guidance, CBAs, monitoring reports, and evaluations. New sectoral guidance from various USAID technical offices and regional bureaus and other information sharing can help bridge these gaps.

**6. USAID will need to increase its efforts at informing staff and partners about the GHG emissions of various interventions and investments.**

Information from other resources can be directly applicable or transferable after some adjustments. USAID funded the development of a relatively simple AFOLU carbon calculator to estimate the CO<sub>2</sub> emissions associated with agriculture, forestry, and land use decisions.<sup>21</sup> USAID is currently funding the further refinement of this tool. Average emission factors for CO<sub>2</sub>, CH<sub>4</sub>, and N<sub>2</sub>O per unit of various fuels and energy sources are available from the U.S. EPA and U.S. Department of Energy.<sup>22</sup> The Intergovernmental Panel on Climate Change (IPCC) maintains a database with standard (tier 1) emission factors for various economic activities that can be used in the absence of more specific data.<sup>23</sup> IPCC also provides country-specific averages for GHG emissions from electric power generation, making their CBA more costly and less reliable.<sup>24</sup>

**7. Unless the revised CBA guidelines reduce the recommended discount rate for economic analyses to three percent, there will still be a discrepancy between the general discount rate and the one used in the USG's SC-GHG values.** However, this is not a problem. The revised CBA guidelines can treat the SC-GHG values as shadow prices and ignore the discount rate used in the Interagency Working Group's calculations.

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<sup>21</sup> <http://afolucarbon.org/> (accessed December 19, 2022).

<sup>22</sup> [https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors\\_mar\\_2018\\_0.pdf](https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf); <https://afdc.energy.gov/data/> (accessed December 19, 2022).

<sup>23</sup> <https://www.ipcc-nggip.iges.or.jp/EFDB/main.php> (accessed December 19, 2022).

<sup>24</sup> [https://unfccc.int/sites/default/files/resource/Harmonized\\_Grid\\_Emission\\_factor\\_data\\_set.xlsx](https://unfccc.int/sites/default/files/resource/Harmonized_Grid_Emission_factor_data_set.xlsx) (accessed December 19, 2022).

## 6. VALUATION OF ECOSYSTEM SERVICES

**The 2015 CBA Guidelines did not address how to value ecosystem (environmental) services in economic analyses. USAID subsequently commissioned two relevant reports on ecosystem valuation, but has only applied these methods in a few cases.** The USAID Biodiversity Office funded a comprehensive report by the BRIDGE Activity on the economic valuation of ecosystem services (Kashi et al. 2018). The former USAID Global Climate Change Office also funded a literature review on valuing mangrove ecosystems (Smith et al. 2018). However, all (five) USAID interviewees who were asked about the application of these guidelines reported that the application remains limited. One interview highlighted that the methods had been used on a few CBAs under the EMD-managed CEADIR Activity focused on natural resource conservation and climate change. The Biodiversity Office did not identify any examples of applying the BRIDGE report recommendations on ecosystem valuation by USAID staff or implementing partners.

**Two interviewees (out of five who responded to questions about the valuation of ecosystem services) for this assessment noted challenges in the prerequisite step of identifying and quantifying the environmental impacts. However, they generally agreed that the valuation of ecosystem services should be integrated into economic analyses prepared by or for USAID.** Placing monetary values on ecosystem impacts in a CBA provides a rigorous framework for comparing interventions to alternatives, including the business-as-usual case. Quantitative cost and benefit information can support decisions on eliminating, reducing, or compensating for adverse impacts on ecosystems or increasing environmental and financial sustainability and climate resilience.

**When the costs and benefits of ecosystem services are not included in a CBA, they are effectively given a value of zero.** Many methods for valuing ecosystem services are likely to underestimate the true values, but they will still exceed zero. However, conservative lower-bound values can sometimes provide a sufficient economic justification for conservation and environmental protection investments and measures.

**On April 4, 2022, President Biden issued an Executive Order to Strengthen America's Forests, Boost Wildfire Resilience, and Combat Global Deforestation.** This Executive Order stated that OMB “will issue valuation guidance to help agencies better account for ecosystem and environmental services (such as pollinators supporting our crops, or forests cleaning our air and water). In support, the Office of Science and Technology Policy and the Department of Commerce will continue leading an interagency initiative to improve and update baseline information on the economic value of our existing natural assets and new nature-based solutions.”<sup>25</sup> The forthcoming OMB guidance will be the first USG-wide effort to promote the economic valuation of the ecosystem and other environmental services. It could have major implications for CBA and other economic analyses at USAID.

### ISSUES, OPTIONS, AND TRADEOFFS

**There are two alternative approaches to ecosystem valuation—revealed preferences and stated preferences.** Most economists consider revealed preferences to be more reliable. Stated preferences are subject to various instrumental, hypothetical, and strategic biases and aggregation and weighting issues.

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<sup>25</sup> <https://www.whitehouse.gov/briefing-room/statements-releases/2022/04/22/fact-sheet-president-biden-signs-executive-order-to-strengthen-americas-forests-boost-wildfire-resilience-and-combat-global-deforestation/> (accessed December 19, 2022).



**Revealed preference methods analyze market transactions and other consumption decisions.** U.S. courts accept them. However, they can only measure current use values. They cannot estimate option demand for future uses or non-use values, such as existence, altruistic, or bequest values.

**Stated preference measures quantify the values that people report in contingent valuation surveys, interviews, bidding games, or tradeoffs.** Unlike single-question surveys or interviews, iterative bidding games attempt to elicit the maximum willingness to pay (WTP) for a good or service or the minimum willingness-to-accept compensation (WTA). However, the amount specified in the initial bid question leads to starting point bias that greatly affects the final bid results.

**Welfare Economics provides no theoretical basis for preferring a WTP measure over a WTA measure.** There is generally a large difference between WTP and WTA results, even though conventional economic theory indicates they should be the same. Behavioral economics offers many explanations for why reported WTP and WTA measures to diverge, including asymmetric treatment of gains and losses, risk aversion, and perceptions about the rights to access environmental quality and natural resources. Reported WTP is likely to be bounded by income or wealth and affected by a poverty or scarcity mindset.

**One early proponent of contingent valuation bidding games, Ralph d'Arge, later raised questions about whether the approach only produced values that are a hypothetical, small proportion of disposable income rather than maximum WTP.** Reported WTA is not bounded by income or wealth. Hyman (1981a; 1981b) and Splash (2008) summarize some concerns about stated preference methods based on human behavioral and ethical issues.

**In theory, stated preference methods can be used to estimate non-use values.** However, people do not always do what they say or intend. They may not take hypothetical questions seriously, have incentives to distort their true preferences, and exercise protest votes about whether they should have to pay for something or a proposed payment vehicle. U.S. courts do not generally accept stated preference methods.

**One of the main barriers to valuing ecosystem services in CBA is insufficient data on the magnitude and likelihood of the potential impacts.** If the physical, chemical, biological, and ecological impacts can be estimated, it may not be difficult to place a value on some ecosystem services. Meta-analyses and databases may be available on the impacts of different actions on various ecosystem services (Kashi et al. 2019). However, some major gaps remain in the understanding of interactions between an intervention and the environment, and marginal and cumulative impacts effects of activities on ecosystem services are where the main data gaps exist.

#### Insights from Interviewees

- Three out of five interviewees who answered questions about the valuation of ecosystem services identified data constraints as a key barrier to the increasing environment and natural resource valuation. Benefit transfer estimates from other locations can provide valuable insights into the magnitude of ecosystem service values in other locations and help identify areas where more in-depth analysis may be required. However, ecosystem service values are often highly site-specific, and adjustments may be needed before they can be transferred.

**USAID has supported some ad-hoc efforts to bridge some of these knowledge gaps.** For example, Murray et al. (2017) studied the effects of conventional agriculture, slash-and-burn cultivation,



fruit plantations, and agroforestry in Ghana is a good reference on how to identify interactions between agricultural interventions and the environment. They assessed the effects on GHG emissions, climate resilience, biodiversity, surface water runoff, nutrient runoff, erosion, and aquifers. They compared the effects on the environmental indicators and the economic value of the agricultural output produced under each alternative—a type of cost-effectiveness analysis. However, Murray et al. (2017) did not take the next step of applying economic valuation methods to incorporate these effects into a CBA.

**Including ecosystem valuation in USAID CBAs will require the multidisciplinary collaboration of experts from different sectors.** USAID’s narrowly defined Congressional appropriations and internal organizational structure are not conducive to cross-sectoral collaborations in the activities’ design, implementation, and evaluation. USAID staff refer to these structural barriers as “silos.”

### Insights from Interviewees

- One USAID interviewee observed that “USAID’s institutional structure in which experts from different sectors work in silos is a crucial barrier to the ... valuation of ecosystem services...”
- The same interviewee noted that “This lack of integration of ecosystem services valuation in the assessment of agricultural interventions has left USAID behind relative to other international organizations that have moved toward supporting more sustainable agricultural and fishing practices”
- EMD could play a key role by developing sector-specific guidance on environmental valuation and connecting CBA teams with natural resource management experts to inform the integration of ecosystem service values in CBAs.

**USAID staff and partners will need sector-specific training on when and how to apply ecosystem service valuation techniques.** It will be necessary to develop the capacity of Agency staff and partners to value ecosystem services in CBAs and other analyses in various sectors. This is an area where economists and environmental experts will need to work together in data collection and application of the analysis.

## RECOMMENDATIONS

- 1. Existing cross-cutting resources prepared for USAID can help practitioners with the conceptual approaches and methods but do not provide the sector-specific evidence base needed to value environmental services.** To address these gaps, USAID will need to fund more knowledge products that summarize available evidence and collect new data on the projected and actual environmental impacts of interventions that can be incorporated into sector-specific guidance.
- 2. EMD can play an essential role by**
  - a. Collaborating with staff and contractors in other technical offices on sector-specific guidance on data collection requirements and economic valuation techniques for environmental services. High-priority sectors for beginning this work include agriculture, livestock, and forestry.
  - b. Helping to ensure greater inclusion of environment and natural resource management experts on staff and contractor teams working on identifying, quantifying, and monetizing the way activities interact with ecosystem services
  - c. Organizing or participating in trainings and webinars on methods and examples of the

valuation of environmental services

## 7. VALUING MORTALITY AND MORBIDITY RISKS

**The value of a statistical life (VSL) is an economic concept used to value a marginal reduction in premature human mortality risk in a CBA.** It represents the value that society places on an incremental reduction in the risk of an earlier death of a nonspecific individual. It is not the value a particular person places on their own life or another specific individual. The VSL is typically reported in dollars per premature statistical death case per year. The VSL is not needed in a CEA.

**There is no USG-wide policy or value for the VSL. Three USG agencies have independently established VSLs for their regulatory CBAs (DOT, EPA, and HHS), and MCC has adopted the VSL for investment decisions in assisted countries.** These four agencies have adopted different values based on disparate and sometimes relatively old studies. USG entities have updated their VSLs at different intervals, often only adjusting for inflation. Some international agencies have also developed or applied VSL estimates on an ad hoc basis based on disparate and relatively old studies.

**The 2015 USAID Guidelines did not address the use of the VSL. Due to ethical concerns, the USAID Global Health Bureau (GH) does not use CBA to place a monetary value on human lives analysis. Instead, GH prefers to use CEA to find the least-cost methods of achieving health outputs or outcomes.** CBA and CEA are also relevant for USAID investments in other sectors that may affect health or safety (e.g., roads and transport systems, bridges, flood protection, buildings, power plants, industrial facilities, water supply and sanitation, and nutrition programs).

Unlike CBA, CEA does not place a monetary value on mortality or morbidity reductions. A CEA can consider the present value of the cost per life saved or the year of additional life gained. This can also be adjusted to reflect the quality of the additional years of life in terms of health status or disability. CEA can be used to compare the cost of different alternatives for reducing the incidence of a disease or illness. It can also estimate the present value of the total costs of achieving specific mortality or morbidity reduction targets. Output measures could include the delivery of a vaccine, effective medical treatment, or preventive health measures. Outcome measures would include the number of premature deaths or illnesses avoided.

**As with the valuation of ecosystem services, there are differing views on whether stated preference or revealed preference measures should be used to estimate the VSL.** Regardless of the method used to estimate the VSL, the application of this concept in a CBA is similar. For example, suppose providing vaccines to a particular group would cost \$100 million and reduce the premature mortality risk for 2,000 people over the next year. By some method, the VSL was estimated at \$1 million. The benefits of the vaccinations would be \$2,000 million in year 1. At a discount rate of 12 percent, the present value of the benefits would be \$1,786 million, which compares favorably to the \$100 million (present value).

**Stated preference measures (also known as contingent valuation) rely on surveys, interviews, or bidding games subject to many instrumental, hypothetical, and strategic biases.** Iterative bidding games are preferred over single questions to elicit the maximum WTP or minimum WTA amounts. However, bidding games produce very different results depending on the value in the initial bid question (*starting-point bias*). In practice, there is a major operational problem because the WTP for a marginal reduction in premature mortality risk is typically far lower than the WTA for a marginal increase in risk. Stated preference approaches for estimating the VSL commonly use WTP rather than WTA measures. However, according to Welfare Economics theory, WTP and WTA should be the same, and there is no theoretical justification for choosing one over the other. Since WTP is bounded by the ability

to pay, it raises more ethical concerns than WTA about placing a higher value on the lives of wealthier people.

Stated preference measures also raise aggregation issues. If a bidding game found that the average maximum WTP to reduce the risk of dying one year earlier by 0.01 percent was \$500 in an area with a population of 10,000 people, the stated preference VSL for this group would be \$5,000,000. Since bidding games require individual interviews that are complex and time-consuming, they usually only involve a small sample. If these values are only elicited for a small sample size, there are serious issues about the representativeness and equity of extrapolating results to a whole population.

**The two most common revealed preference approaches for the VSL are the human capital approach and the wage differentials approach. U.S. courts and legal settlements have often applied the human capital approach for compensation decisions in tort cases involving loss of life or ability to work.**

**The *human capital approach* estimates the present value of the average future income stream (including the value of fringe benefits) for a population or subgroup that would be lost due to an incremental risk of premature death or disability.** The human capital approach is sensitive to the average age of the population or group and the number of years spent in the workforce. It is problematic for countries or groups with high unemployment and underemployment rates because the resulting low wages result in low values for mortality risk reductions. The human capital can be adjusted to account for the value of unpaid work. However, it cannot accommodate people who do not perform unpaid household work, such as the elderly and people with chronic illnesses or significant disabilities. It does not distinguish between the economic cost of death and permanent disability. It does not place any value on lost personal happiness or pain and suffering and psychic costs to family members and friends (which can be considered in subjective court awards or legal settlements). It raises ethical issues because it greatly affects the value of lives in high- versus low-income countries and subnational areas (Hyman 2015).

**The *wage differentials approach* (also called the *hedonic wage approach*) compares wage rates in occupations with similar skill levels or in more polluted locations with different mortality risk rates. This information estimates the pay premium for higher-risk occupations, a **WTA measure**.** This approach does not compare vastly different jobs, for example, miners and college professors. It cannot be used if workers in higher-risk occupations are actually paid less than those in safer jobs with similar skill levels. That can happen if the riskier occupations tend to be filled by disadvantaged or marginalized workers living under severe poverty constraints. This approach also raises ethical concerns because it assumes freedom of choice and perfect information (Hyman 2015).

The accuracy of hedonic wage studies has improved with the availability of data from the Bureau of Labor Statistics Census of Fatal Occupational Injuries (CFOI) and the Panel Study of Income Dynamics (PSID) in the United States. The CFOI is a complete census rather than a sample of work fatalities. It is classified by industry and occupation, facilitating comparisons to variations in wage rates. Some of the new studies use panel data to analyze the behavior of workers who switch from one job to another. As a result, the tradeoffs between wages and risk reflects the preferences of a single individual rather than differences in preferences across individuals. However, the wage differentials approach still extrapolates VSL estimates to other people who were not the subjects of the original studies.

**The third type of revealed preferences approach is estimating the VSL from the implied tradeoffs between money and mortality risks in individuals' preventive health and safety expenditures in the aggregate (society) and government investment or regulatory decisions.**

Examples of individual or household decisions include relocating to healthier areas or purchasing air conditioners and air purifiers, water filters and bottled water, optional safety equipment, and preventive or curative medical treatments. Individuals can also make defensive expenditures that pool the financial impacts of death without changing mortality risks, such as purchasing life insurance to safeguard family members against lost income.

Employers may bear or share medical insurance or treatment costs for their workers. Governments make regulatory decisions about health and safety standards that can impose costs on private or public sector entities that place implicit values on the resulting mortality and morbidity risks. Examples include pollution control regulations, occupational safety laws, transportation safety requirements, and building standards. Governments also make direct expenditures for infrastructure safety and disaster risk reduction and response (Hyman 2015).

Individual and even societal decisions on WTP for preventive and defensive expenditures are bounded by the ability to pay and are strongly affected by either insufficient or excessive information. Behavioral economics, psychology, political science, public administration, and organization theory have made it clear that private and public purchase and regulatory decisions are not solely based on rational calculations and often rely on simplifying heuristics. As a result, comparisons of the implied VSL across different investment and regulatory decisions typically reveal major inconsistencies in the values and differences in available information.

**The VSL is an established, although controversial, concept that can be estimated using various alternative techniques. It is subject to considerable risk and uncertainty. Nevertheless, there is a common misperception that the VSL is a fixed value that an individual or society places on saving a life with certainty.** Theoretical and practical limitations in estimating and using the VSL, risk, uncertainty, and ethical concerns often generate aversion to this concept.

The U.S. EPA now favors a slightly different concept, the value of mortality risk reduction, but has not yet established a value for this measure. The *value of mortality risk reduction* is reported in dollars per micro-risk of dying per person per year. The U.S. EPA planned to define a *micro-risk* as an additional one-in-a-million chance of dying ([more information here](#)).<sup>26</sup>

#### Hypothetical Example of the Value of Mortality Risk Reduction

A pollution control investment or regulation would reduce the death risk from water pollution by one per million in a city of 5,000,000 people. A stated preferences study for the city found an average WTP of \$40 per person to reduce the death risk by one in a million. The proposed investment would avert five deaths over the next year.

**The value of mortality risk reduction:**  $\$40 / (1/1,000,000) = \$40,000,000$ .

**The total benefits of the investment:**  $(5 \text{ deaths averted} \times \$40,000,000) = \$200,000,000$ .

## APPLYING VSLs

**Few low- and middle-income countries have official VSL estimates.** Some academic researchers have produced unofficial estimates of the VSL for a relatively small number of developing countries.

<sup>26</sup> For more information, see <https://www.epa.gov/environmental-economics/mortality-risk-valuation> (accessed December 19, 2022).

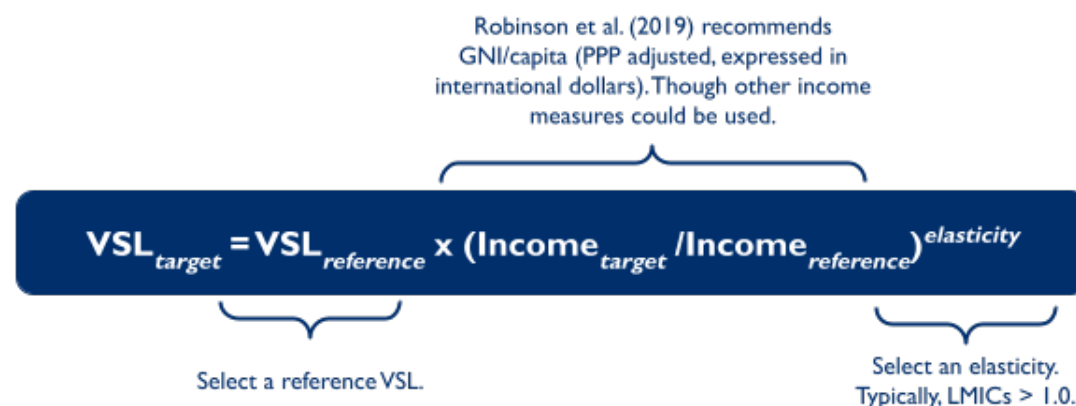
However, most academic studies have used stated preference approaches with validity, reliability, and bias problems. Since stated preference studies are costly and time-consuming, they generally have sample sizes that are small or limited in geographic coverage.

**Since the USAID Global Health Bureau does not use this approach, it is unlikely that USAID would support a study to estimate the VSL for a partner country at the national level or for a specific subgroup or geographic area.**

**In the absence of official estimates, most applications of the VSL have used an adjusted benefit-transfer approach to convert reference values for high-income countries to presumed equivalents for low- and middle-income countries.** Reference VSLs are typically adjusted for differences in per capita GDP or Gross National Income (GNI) and the income elasticity of demand for reductions in premature mortality risks. GDP is the total market value of all final goods and services produced within a country during a year. GNI is the total income a country's residents and businesses receive, whether inside or outside the country. There are differences of opinion about the income elasticity of demand values and whether additional adjustments should be made to reflect the age structure of the populations.

Figure 8 contains a formula for extrapolating a reference VSL from one country or time to another country or time (Robinson et al. 2019). This formula does not include any adjustments for a population's age structure or health status. Appendix B of Robinson et al. (2019) contains calculated VSL values.

**FIGURE 8: Extrapolating VSLs**



## I - SELECTING A REFERENCE VSL

**The first step in the benefit transfer is selecting a reference VSL.** Many studies have estimated the VSL in a particular country or subpopulation, although most have been conducted in high-income countries. Some entities have calculated averages of the estimates from disparate stated preferences and revealed preferences approaches, but there is no theoretically valid justification for using these averages. Reference VSLs from an earlier year have to be adjusted for inflation before use in a CBA.

In the absence of OMB guidance on the VSL for all Federal agencies, USAID may want to review the diverse values that the OECD and four USG entities have used -- MCC, U.S. Department of Health and Human Services, U.S. Environmental Protection Agency, and U.S. Department of Transportation.

OECD (2012) reviewed some now-dated stated preference studies of the VSL in its member countries and found an average VSL of \$3.0 million for adults in 2005 dollars. It proposed using the average in the base case analyses of decisions in member countries and the range of \$1.5 million to \$4.5 million in 2005

dollars in sensitivity analyses. For a subset of 27 European Union countries, the average VSL for adults was \$3.6 million in 2005 dollars, and the range was \$1.8 million to \$5.4 million. World Bank and IHME (2016) updated the OECD member average to \$3.8 million in 2011 dollars.

**Four USG agencies have recommended using the VSL for valuing mortality risk reductions in regulatory or investment decisions.** Among the most recent to adopt this approach is MCC (in 2021). Key institutional differences are summarized in the following table. These institutional differences reflect ongoing theoretical and empirical discussions that are unlikely to be definitively resolved. Any recommendations for USAID should therefore prioritize intra-agency consistency both concerning base case VSL values and standard sensitivity analyses. Robinson et al. (2019) serve as a useful starting point for informing these base case assumptions and sensitivity analyses as it is designed for those working in global health and development.

Table 8 summarizes the guidance, methods, and VSLs set by the four USG entities. For comparability, the assessment team converted their VSLs from different years to 2015 dollars and adjusted them for increases in per capita income. Some of these agencies have used an inflation index to update their values for later years. However, they may have used a different inflation index or period assumption (such as the USG fiscal year instead of the calendar year). The assessment team's adjusted U.S. reference VSLs for DOT, EPA, and HHS averaged between \$8.7 million and \$9.6 million in 2015 dollars. MCC has applied the HHS guidance.<sup>27</sup>

Some USG entities, such as EPA, have discussed the possibility of adjustments for real per capita income changes but have not applied them.

The following box discusses two examples of USAID-funded CBAs that have applied the VSL to alternatives with different mortality risk profiles.

#### Examples of the VSL in USAID Funded CBAs

The USAID-funded CEADIR Activity prepared CBAs of alternative urban household cookstoves and fuels in Malawi and Zambia (Matek et al. 2021a and 2021b) that estimated the costs of premature mortality risks from fine particulate (PM 2.5) exposures in outdoor and indoor cooking. Both analyses used the relatively low World Bank and IHME (2016) reference VSL of \$3.8 million in 2011 dollars in the base case.

In sensitivity analyses, both studies used a much higher reference VSL of \$9.6 million in 2015 dollars (Viscusi and Masterman 2017). CEADIR adjusted the two reference VSLs for differences in the per capita GDP of the two countries using the Kneisner and Viscusi (2019) method. In the base case, the adjusted VSLs were \$26,497 for Malawi and \$118,270 for Zambia. In the sensitivity analysis, the adjusted VSLs were \$62,230 for Malawi and \$277,762 for Zambia.

## 2 - ADJUSTING FOR PER CAPITA NATIONAL INCOME

**Benefit transfer approaches often adjust the reference VSL for the difference between the per capita national income of the reference and target populations.** Various national income measures have been used. Robinson et al. (2019) recommended using the GNI in dollars adjusted for country differences in purchasing power parity (PPP). GNI is a broader measure of income than Gross

<sup>27</sup> There is a slight discrepancy in the listed central estimate between MCC, HHS, and the reference case (Robinson et al. 2019) - this may be due to inflation adjustments/extrapolations across years.

Domestic Product (GDP). GNI includes income that companies and individuals receive from outside the country, while GDP is limited to income earned within the country. GNI and GDP estimates are generally available for a large number of countries.

Robinson et al. (2019) recommended against using subnational differences in per capita national income in applying the VSL within a country, even though it may be available in some developing countries. Other economists have recommended subnational VSL adjustments for per capita income for economic efficiency reasons. Subnational differences in per capita income are likely to affect local WTP or WTA for changes in mortality risks. However, if an analysis supports national government or donor investments or national regulatory decisions, equity and justice concerns could weigh against using different subnational VSLs.

Robinson et al. (2019) also recommended an additional adjustment for real per capita income changes over time. Real per capita income can increase or decrease over time.

### 3 - ADJUSTING FOR THE INCOME ELASTICITY OF DEMAND

WTP measures are limited by the ability to pay. WTA measures are affected by the greater need for money at low wealth levels. WTA is also affected by the diminishing marginal utility of money, which makes larger amounts of money necessary to achieve the same welfare gain at higher wealth levels. Although wealth (total assets) is the more relevant factor, annual income is easier to measure.

**VSL studies based on either stated or revealed preference approaches have typically found a higher maximum WTP and a higher minimum WTA for higher-income people.** However, the evidence is less clear on how the VSL changes with income. This is called the *income elasticity of demand for mortality risk reduction*. If the income elasticity of demand is greater than one, the VSL increases more than income. If the income elasticity is less than one, the VSL increases less than income. However, the income elasticity of demand might not vary linearly with income. Several VSL studies have found an income elasticity of around 1.0 (OECD 2016; Viscusi and Masterman 2017; Masterman and Viscusi 2018). Robinson, Hammit, and O’Keeffe (2019) recommended assuming an income elasticity of demand of 0.8 for high-income countries and 1.0 to 1.2 for low-income countries. In a 2022 discussion of the Resources for the Future estimates of the social cost of GHGs, Maureen Cropper argued that the income elasticity of demand of 1.0 was too high for low-income countries. DOT, EPA, and HHS have assumed an income elasticity of 1.0 for the VSL in base case analyses. MCC currently uses a base case income elasticity of 1.5 for the VSL.

Masterman and Viscusi (2017) derived a VSL for approximately 200 countries using a U.S. reference VSL of \$9.6 million, U.S. income of \$55,980, and income elasticity of demand of 1.0. They applied for the World Bank country income classification. They recommended average VSLs of \$107,000 for low-income countries, \$420,000 for lower-middle income countries, \$1.2 million for upper-middle income, and \$6.4 million upper-income countries.

### 4 - ADJUSTING FOR AGE

**There is controversy about whether to adjust VSLs for the age of the affected populations by considering the value of a statistical life-year or refinements to reflect health and well-being measures as well as the length of life.** Studies in some high-income countries have found that VSLs 1) may be twice as high for children than for adults of average age, 2) may begin declining at middle age for working-age adults, and 3) remain constant or continue declining for older adults (Robinson et al. 2019). Societal values often differ in low- and middle-income countries and vary across cultures. Relatively little information is known about these patterns in different countries. As a result, the practices of various



USG agencies vary. For example, MCC applies an age adjustment for populations under 18. HHS does not recommend an age adjustment for the VSL due to the inconclusive evidence. However, it recommends sensitivity analyses to substantial impacts on the young or old based on quality-adjusted life years (QALYs).

The following box describes the value of a statistical life-year (VSLY).

### VSLYs

The *value of a statistical life-year (VSLY)* is a modification of the VSL that considers the number of years of life that may be lost from premature death (Patenau et al. 2019). There is no consensus on whether to adjust the VSLY for age. VSLYs are unlikely to be constant with age, but this is often assumed for simplicity since there is inconclusive evidence about whether VSLYs decline with age or have an inverted-U shape that peaks around middle age. There may also be ethical concerns about using age-adjusted VSLYs in a base case analysis. Some may recommend applying an age-adjusted VSL in a sensitivity analysis of interventions that disproportionately affect the young or old. The VSLY can be estimated by dividing the average VSL for a population by the undiscounted future life expectancy at the average age of an adult population in the country (Robinson, Hammitt and O’Keeffe 2019).

**TABLE 8. VSLs USED BY OTHER ORGANIZATIONS**

	<b>Millennium Challenge Corporation</b>	<b>U.S. Department of Health and Human Services</b>	<b>U.S. Department of Transportation</b>	<b>U.S. Environmental Protection Agency</b>
Guidance	MCC (2021)  Annex I addresses the value of a statistical life <sup>28</sup>	HHS (2017)  Latest update: U.S. Department of Health and Human Services (2021) <sup>29</sup>	DOT (2021) <sup>30</sup>	EPA (2010) White paper <sup>31</sup>  Science Advisory Board review of White Paper <sup>32</sup>
Approach to Deriving Central Estimate	Adopted the HHS reference VSL.	Criteria for inclusion of revealed preference studies:  1) Use of hedonic methods, 2) Controlled for potential confounders; 3) High quality risk data comparable to CFOI  Criteria for inclusion of stated preference studies:  1) Elicited values for private risk reductions to respondent, 2) Risk change expressed as a probability; 3) Based on WTP, not WTA; 4) Provided evidence of validity, including sensitivity of WTP to changes in risk magnitude	Criteria for inclusion of VSL studies:  1) Only allows the hedonic wages approach, 2) Conducted in past 10 years, 3) Risk data from the CFOI, 4) Use of appropriate econometric techniques  15 studies met the criteria, but six were dropped due to implausibly high VSLs or other concerns  The remaining nine studies were adjusted for inflation and real income growth  The average, adjusted VSLs were then averaged for the central estimate Updates the VSL annually for inflation	Fit a Weibull continuous probability distribution to the findings of 26 VSL studies -- 21 based on hedonic wage methods and five based on stated preferences  Acknowledged that many of the studies included in 2006 are dated. Plans to include more recent studies in revised guidance

<sup>28</sup> <https://www.mcc.gov/resources/doc/cost-benefit-analysis-guidelines#annex-i-value-of-a-statistical-life> (accessed December 19, 2022).

<sup>29</sup> <https://aspe.hhs.gov/sites/default/files/2021-07/hhs-guidelines-appendix-d-vsl-update.pdf> (accessed December 19, 2022).

<sup>30</sup> <https://www.transportation.gov/office-policy/transportation-policy/revised-departmental-guidance-on-valuation-of-a-statistical-life-in-economic-analysis> (accessed December 19, 2022).

<sup>31</sup> <https://www.epa.gov/environmental-economics/valuing-mortality-risk-reductions-environmental-policy-white-paper-2010> (accessed December 19, 2022).

<sup>32</sup> [https://www.epa.gov/system/files/documents/2022-03/86189901\\_0.pdf](https://www.epa.gov/system/files/documents/2022-03/86189901_0.pdf) (accessed December 19, 2022).

**TABLE 8. VSLs USED BY OTHER ORGANIZATIONS**

Assessment Team's Adjusted Reference VSL (in 2015 dollars adjusted for real income growth and inflation)	\$9.4 million	Six revealed preference and three stated preference studies met the inclusion criteria  After adjusting for inflation, these studies had VSLs between \$4.5 million and \$14.4 million, with an average of \$9.5 million	\$9.6 million	\$8.7 million
Base Case Income Elasticity of Demand for the VSL	Following Robinson et al. (2019): 1.5 in the base case, with sensitivity analyses at 0.0, 0.5, 1.0, and 2.0.	1.0	1.0	0.08, 0.40, and 1.0. Has not specified when or how to apply these income elasticities
Age Adjustments	Multiplied by 1.00 for people 18 years of age or more  Multiplied by 1.75 for people younger than 18 years of age	Not recommended  Constant VSL with sensitivity analysis and QALY adjustment when populations are very young or very old (not defined).	Not recommended  Encouraged description of differential impacts on infants, passengers with disabilities, or elderly persons (without adjusting the VSL).	Not recommended  Encouraged identification of the age distribution of the affected populations

### Quantifying Morbidity Risk Reductions

Some morbidity (illness) risks are associated with future premature death risks and can be analyzed with the same techniques used for valuing immediate mortality risk reductions in a CBA. Premature deaths may just occur later in the future and require a longer period of discounting for the time value of money. Alternatively, for USAID to apply for morbidity risk reductions, CEA would be a simpler approach. Quality-adjusted life-years (QALYs), health-adjusted life-years (HALYs), and disability-adjusted life-years (DALYs) are particularly relevant for analyzing morbidity risks and avoiding placing a monetary value on the change in morbidity risk in a CEA framework. The World Health Organization applies the DALY measure in its periodic reports on the Global Burden of Disease from various risks.

Some morbidity risks might not increase premature death risks, or it can be difficult to determine whether they will affect longevity, especially with increased use of preventive, curative, ameliorative, or palliative medical services. It can also be difficult to assess the increases in morbidity risks because health effects are complex and affected by baseline health status, genetics, and lifestyle.

Increases in morbidity risks can have high economic costs, whether or not they are associated with premature mortality. Conversely, some or all of these costs can be averted by reducing morbidity risks. Higher morbidity rates can bring additional costs that might not apply to higher immediate death rates. Illnesses can lead to lost income or work productivity over a long period. They typically lead to additional direct costs for medical treatments (doctors, hospitals, diagnostic tests, pharmaceuticals,

surgical procedures, and paid caregivers) and associated travel costs. These tangible morbidity costs are valued at market prices and are more straightforward to analyze than premature death risks. However, it can be difficult to obtain the necessary cost data, and it can vary a lot by location and the decisions of different individuals.

Low-income people might not have access to the same amount and types of medical services in their areas. Even if they did, low-income people might not be able to afford them with their financial resources, and they may lack good insurance or government-funded services. There are also indirect economic costs for the time spent by unpaid family caregivers (see the subsequent section on valuing unpaid labor time).

## RECOMMENDATIONS

1. **To reduce methodological and ethical concerns, the USAID Global Health Bureau (USAID/GH) uses cost-effectiveness measures to analyze the efficiency of interventions that affect mortality and morbidity risks. The revised USAID CBA guidelines should allow using either CBA or CEA approaches for valuing changes in mortality and morbidity risks.** Many USAID programs, such as food and nutrition, water supply and sanitation, humanitarian assistance, pollution prevention and control, and climate change adaptation, could increase the use of CBA or CEA for premature mortality and morbidity risks. Only a few CBAs prepared for USAID have applied the VSL approach.
2. **If OMB issues new guidance for CBA for all Federal agencies that address the valuation of changes in mortality and morbidity risks, USAID staff and partners should follow the required or recommended practices.**
3. **Without any OMB guidance for CBA on the valuation of changes in mortality and morbidity risks, the USAID guidelines should encourage using CBA or CEA to analyze these risks.** Since few, if any, USAID-assisted countries have set official VSLs, an adjusted benefit transfer approach will generally be needed to extrapolate a reference VSL for a CBA in another country.
4. **USAID should consider recommending a specific reference VSL used by another USG agency based on revealed preference rather than stated preference data.** DOT is the only USG agency that has adopted a reference VSL based only on a revealed preferences (wage differentials) approach. The DOT's reference VSL also has the advantage of being updated annually for inflation.
5. **When the adjusted benefit transfer approach is used to extrapolate a reference VSL for another country, the income elasticity of demand for mortality risk reductions needs to be specified. This assumption is controversial and should be addressed in the revised USAID CBA guidelines.** MCC has adopted a relatively high-income elasticity of 1.5 in base case analyses. However, several notable economists have recommended an income elasticity of demand of 0.8 for mortality risk reductions in high-income countries and 1.0 to 1.2 for low-income countries. The latter range seems reasonable for most USAID-assisted countries. The revised USAID guidelines should also specify the income elasticities to be used in sensitivity analyses.

6. **The revised USAID guidelines should specify whether, when, and how the VSL should be adjusted for differences in the age structure of the populations in the reference VSL and benefit transfer countries in a base case and sensitivity analyses.** Economists have different views on the inclusion of age adjustments in the VSL, and the practices of USG agencies and development assistance organizations vary. Since the purpose and context of a CBA may have a bearing on this decision, it may be best if the revised USAID guidelines allow flexibility on this issue.
7. **The revised guidelines should emphasize the importance of communicating the methods, assumptions, and limitations of the approaches used in a CBA or CEA of mortality and morbidity risk reductions.** These concepts and methods may be unfamiliar to decision-makers and other audiences and may raise some ethical and justice concerns.

## 8. VALUING LABOR AND LEISURE TIME

This section discusses approaches for valuing changes in paid (market) labor and unpaid (non-market) work, and leisure time in various sectors. Unpaid labor has an opportunity cost because it could have been devoted to other paid or remunerated work. This *opportunity cost* is the value of the highest alternative productive use of the time foregone, and it is often included as a shadow price in a CBA.

A large proportion of the labor force in low-income countries works on family farms or individual or household informal sector activities that do not pay fixed time-based wage rates. These workers may earn income from the revenues generated by these productive activities or share in the benefits to their families. People in all countries, particularly women, provide valuable services to their family members without receiving direct payment.

Increases in time requirements for tasks that reduce leisure time decrease human welfare and vice versa. In an economic analysis, increases in time use are counted as a cost, while decreases in time requirements are a benefit (Whittington and Cook 2019). However, the economic value of leisure time may be lower than the value of labor time.

**Development assistance organizations, public investments, and policy changes can affect how individuals and households allocate their time to paid and unpaid work and leisure activities.** The availability of financing, subsidies, inputs, technologies, training, infrastructure, market service, and policy reforms can increase or decrease the labor time required and the profitability of productive activities, which in turn, affects incentives for participation.

Changes in the location of public services can reduce the time required to obtain the services, especially when transportation is costly or difficult. People can save considerable time when a water source, health clinic, or government office is located closer to the community or when roads are built or improved to reduce travel time. However, some public investment decisions can have near-term or long-term negative impacts on the time spent by people in certain locations. Road and infrastructure construction can cause temporary disruptions that increase travel time. Land flooding for large-scale hydropower can require permanent resettlement and relocation of economic activities.

**The 2015 CBA Guidelines recommended valuing unpaid labor time from hired or family workers at the prevailing market wage rate for the required skill sets. If there are substantial labor market distortions, the Guidelines suggest using a range of wage rates in a sensitivity analysis.** The Guidelines recommended interviewing stakeholders, country experts, and implementing partners to collect data on wages for workers with similar skills and demographic characteristics (age and gender) and account for seasonal variations.

**The Guidelines stated that wage rates should be adjusted for the expected real changes in labor prices, if possible.** Real changes in market wages are not the same as nominal changes due to inflation. Since CBAs are conducted at real prices, changes due to general inflation should **not** be factored into the analysis. It is difficult to predict real price changes above and beyond the general inflation rate. Differential inflation rates for wages are not normally assumed in economic analysis. One exception might be if a law has already been passed mandating minimum wage increases in future years. However, the higher statutory minimum wage rates would need to be adjusted to remove the effects of the general inflation rate to identify the real wage rates. Even if the nominal wage rate is set to increase, this could end up being a real wage decrease in a high-inflation economy.

**The 2015 CBA Guidelines recommended that analysts value unpaid labor time from hired or family workers at the prevailing wage rate for the particular skill set required and the price paid on the market at the time of demand. If the labor market suffers from substantial distortions, the guidelines recommend a sensitivity analysis with a reasonable range of wage rates.** Since there is no single prevailing wage rate or type of employment, the assessment team recommends that the revised guidelines call for conservative, lower-bound wage rates.

**The 2015 CBA Guidelines recommended interviewing stakeholders, country experts, and implementing partners to collect data on wages.** Data collection efforts should distinguish between urban and rural wage rates and the type of work (formal sector, informal sector, and subsector). They should also consider variations based on seasonality, worker skills level, age, and gender.

After-tax wage or salary rates loaded with fringe benefit rates are a good measure of the opportunity cost of hired workers in the formal sector, particularly in urban areas. However, informal sector workers generally have lower education, skill, and experience levels than formal sector employees and receive a lower wage rate and no fringe benefits (including statutory taxes and retirement contributions). The daily wage for a casual agricultural worker is often used as the shadow price for unpaid labor in rural areas.

## **VALUING PAID LABOR TIME**

**Formal sector employers in high-income countries generally comply with labor and tax laws. Then, the total cost to the employer includes payroll taxes, mandatory and voluntary benefits, and other expenses.** This total compensation package is relevant in financial analyses that reflect the companies' perspective. Financial analyses that take the perspective of the employees would not include taxes borne by employers that do not benefit the employees since this would not be part of the opportunity cost of the employees' time. In low-income countries, informal sector work is often the major source of cash income for most nonagricultural households. Informal sector employers generally do not pay labor taxes or fringe benefits. Informal sector wage rates may be most relevant in a conservative lower bound estimate of the opportunity cost of work time.

**USAID's targeted beneficiaries are in low- and middle-income countries and most work in rural or informal sectors in urban areas. Access to reliable data on compensation packages for formal sector labor and wage rates for informal sector workers is a major challenge in most low- and middle-income countries.** High-income countries may collect and report employer costs compensation data. However, many low- and middle-income countries do not have formal sector compensation data disaggregated by industry, occupation, geographic area, age, and gender. Casual daily wage rates are most relevant for USAID beneficiaries and are much lower than the average annual salaries of formal and public sector workers. It may be necessary to collect primary data on local wage rates and employer costs.

Faster and easier macro-data-based alternatives, such as dividing the labor share of per capita GDP or GNI by the average annual work hours in the country to estimate an hourly wage rate, are likely to be inaccurate for any specific location. Whittington and Cook (2019) and Robinson et al. (2019) also discussed problems with other alternative procedures and data sources for estimating the after-tax wage rate in low- and middle-income countries:

- I. Obtain self-reported household wages from the World Bank's periodic Living Standards Measurement Survey (LSMS) or Labor Force Surveys (LFS). However, The LSMS and LFS surveys

are infrequent, may be too dated to use, and might not adequately cover rural areas and informal sector workers.

2. Estimate after-tax wages from information on tax withholdings. MCC has used this approach, but it is not relevant where informal sector employment dominates.
3. Convert self-reported household income data to an after-tax wage rate, but household income data are often of questionable reliability.
4. Find other existing survey data on wage rates for unskilled labor.

## VALUING UNPAID LABOR AND LEISURE TIME

**It is difficult to obtain data on the allocation of time for unpaid work and leisure time for most low- and middle-income countries.** Robinson et al. (2019) recommended that economic analyses combine times spent on unpaid household labor, unpaid work time outside of the household, and leisure activities into the non-market category for simplicity and difficulty in showing how they are affected by an intervention or policy. Other economists have recommended separating leisure time from unpaid labor because they have different implications for economic utility (Alpman et al. 2018; Van de Ven et al. 2018). Irrespective of whether leisure has its category, it is important to consider the welfare effects of changes in time allocations.

The OECD.Stat<sup>33</sup> database contains data on time use in member countries and China, India, and South Africa. This database reports age- and sex-disaggregated survey data on time spent in 1) paid work or study, 2) unpaid work, 3) personal care, 4) leisure and 5) other uses. For economic analyses, it would have been better if the OECD had separated paid work and study time. Unfortunately, most developing countries do not have national-level data on time use.

**There is less consensus among economists on how to value unpaid household work and leisure time.** Robinson et al. (2019) noted the common practice of using market wage rates to value changes in paid work time and some lower percentages of market wage rates to value unpaid household responsibilities and leisure time. Some CBAs have valued leisure time at half the market wage rate, although this is an arbitrary assumption. If socio-cultural constraints limit the ability of women to obtain employment outside of the home, it may be possible to estimate the cash and in-kind costs of having a non-family member provide the services. Whittington and Cook (2019) emphasized the need for empirical analyses of the economic value individuals assign to time saved in non-market activities.

A common practice by analysts in high-income countries is to assume that non-market time value is at minimum equal to the after-tax wage rate because that is the relevant opportunity cost faced by the individual (Baxter et al. 2017; Boardman et al. 2018, Cook et al. 2016, Robinson et al. 2019). However, Whittington and Cook (2019) noted that this would only be true if people could substitute time spent in unpaid work (non-market activities) with formal sector employment. That is not a realistic assumption in low- and middle-income countries where a large share of the work opportunities are in the informal sector, most workers do not pay taxes, and commercial and subsistence household production is important. It is even more challenging to value leisure time because its valuation typically relies on revealed or stated preference approaches. Stated preference approaches are particularly questionable in obtaining information about hypothetical alternatives from people with low education levels.

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<sup>33</sup> [https://stats.oecd.org/Index.aspx?datasetcode=TIME\\_USE](https://stats.oecd.org/Index.aspx?datasetcode=TIME_USE) (accessed December 19, 2022).



**Whittington and Cook (2019)** reviewed some stated and revealed preference estimates of the opportunity cost of time in health, transportation, and water supply applications in low- and middle-income countries. Most estimates were based on after-tax wage rates. Whittington and Cook (2019) also noted that opportunity cost of time estimates are not easily transferable across sectors and even individuals in similar occupations. They stated that there is insufficient evidence on whether and how the value of time changes across different activities, such as collecting water or fuelwood and waiting for public services versus waiting in traffic.

TABLE 9. SUMMARY OF SOME STUDIES ON THE OPPORTUNITY COST OF TIME			
AUTHORS	SECTOR	COUNTRY	VALUATION METHODS
Whittington et al. (1990)	Water supply	Kenya	<ul style="list-style-type: none"> <li>Estimated the lower and upper bounds of the value of time using differences in revealed preferences for water from kiosks, vendors, and open wells.</li> </ul>
Asthana (1997)	Water supply	India	<ul style="list-style-type: none"> <li>Estimated the value of time as the marginal rate of substitution between time spent collecting the water and money paid for water (a revealed preference approach).</li> <li>Estimated the value of travel time as a percent of the unskilled wage rate.</li> </ul>
Dissanayake and Morikawa (2002)	Transport	Thailand	<ul style="list-style-type: none"> <li>Estimated time value as a function of travel time and cost and average income based on revealed preferences on vehicle ownership, mode choice, and trip chaining.</li> </ul>
Alpizar and Carlsson (2003)	Transport	Costa Rica	<ul style="list-style-type: none"> <li>A stated preference approach to estimating the value of travel time and pollution reduction through policies to decrease traffic congestion in private transportation.</li> <li>Estimated an average value of travel time as a percent of respondents' average reported wage rate.</li> </ul>
Liu (2007)	Transport	China	<ul style="list-style-type: none"> <li>Estimated the tradeoffs between travel time and travel cost through a hybrid revealed and stated preference survey on work-trip mode choice.</li> <li>Estimated in-vehicle and out-of-vehicle travel time values as a percent of respondents' average reported wage rates.</li> </ul>
Walker et al. (2010)	Transport	China	<ul style="list-style-type: none"> <li>A hybrid choice model that treated travel time as a latent (i.e., unobservable) variable and applied it to transportation mode choices for commuting.</li> <li>Estimated the average value of travel time as a percent of average city income from published data.</li> </ul>
Jeuland et al. (2010)	Health	Mozambique	<ul style="list-style-type: none"> <li>A revealed preference travel cost approach that estimates the averaged value of time as the ratio of the coefficient of time spent traveling and queuing to the coefficient of transport cost.</li> <li>Estimated the value of travel time as a percent of the median of the respondents' reported wage rate.</li> </ul>
Kremer et al. (2011)	Water supply	Kenya	<ul style="list-style-type: none"> <li>Combined a revealed preference travel cost model of water source choice with stated preference ranking and valuation.</li> <li>Estimated the value of travel time as a percent of the unskilled, casual labor wage rate.</li> </ul>

**TABLE 9. SUMMARY OF SOME STUDIES ON THE OPPORTUNITY COST OF TIME**

<b>AUTHORS</b>	<b>SECTOR</b>	<b>COUNTRY</b>	<b>VALUATION METHODS</b>
Larson et al. (2016)	Labor market choices	Botswana	<ul style="list-style-type: none"> <li>• Stated preference (contingent behavior) approach to estimating the value of travel time by job characteristics and gender and reported daily earnings.</li> </ul>
Wondemu (2016)	Waiting for public services	South Africa, Nigeria, Ethiopia	<ul style="list-style-type: none"> <li>• Stated preference approach with open-ended questions on maximum WTP for reducing waiting time for public services.</li> <li>• Reported time values as a percent of the average wage rate in the city.</li> </ul>
Cook et al. (2016) and Cook, Kimuyu, and Whittington (2016)	Water supply	Kenya	<ul style="list-style-type: none"> <li>• A repeated discrete choice stated preference approach to estimating the value of travel time as a percent of the respondents reported wage rate.</li> </ul>

SOURCE: Adapted from Whittington and Cook (2019).

The average opportunity cost of time in these studies ranged from 25-75 percent of the average household income or the average wage rate. However, they pertained to a small number of countries, and many are now quite dated. Nevertheless, these findings are similar to the results of studies in high-income countries. Consequently, Whittington and Cook (2019) recommended valuing changes in household time use outside of the formal sector in developing countries at 50 percent of the average after-tax wage rate. Yet, they also raised questions about determining the after-tax wage rate in specific locations.

**In some cases, new primary data collection may be warranted. However, it is important to consider the costs and time required for primary data collection and analysis and problems with the reliability of self-reported income data, particularly for total household income.** If all household members who earn income are not interviewed, total household income is likely to be under-reported. Some respondents may be reluctant to let other household members know their actual incomes if they are not interviewed separately. It can also be difficult to get accurate estimates of household revenues from sales of crops and livestock and artisanal products or services.

Field et al. (2022) compared different approaches to time use studies in low-income countries -- survey questionnaires; observation-based, time diaries; and experiential sampling methods. They recommended a low-cost approach for rural populations with low literacy levels based on a hybrid method that combines elements of the assisted time diary approach and stylized survey questions. Respondents are asked to provide a narration of how they spent their days, and enumerators allocate the reported time to a limited number of categories. The authors reported that the hybrid method was faster and less expensive than the widely used one. Assisted retrospective diary approach required less training time for enumerators, and caused less respondent fatigue and cognitive burden.”

### **WATER, SANITATION, AND HYGIENE (WASH)**

**Development assistance activities that establish or improve WASH infrastructure can reduce the time costs of households in collecting water.** The benefits of the time saved from water supply investments are the difference between the total amount of time spent by the beneficiaries with and without the investment and then multiplied by the average value of their time.

**This time savings can be an important part of the total economic benefits of WASH CBAs.**

Hutton and Haller (2004) analyzed the value of the time saved from improving access to safe drinking water in each of the World Health Organization's subregions and aggregated them to the global level. MCC's CBA guidance for WASH projects (Osborne 2019) noted that the time savings amounted to three-quarters of the total benefits of a water program in Zambia. More studies are needed to compare the time savings and health benefits of different water supply activities in other locations and contexts.

Osborne (2019) defined the value of the time of a family member as the wage rate they could have earned if there were no barriers to labor force entry (the *marginal productivity of labor*). Osborne (2019) recognized that the market wage might overestimate the value of this time when water collection is done by women and children who typically face major barriers to participation in the labor force. The MCC guidelines discussed alternative methods of estimating the opportunity cost of time for women in the targeted beneficiary populations:

- Survey women in the beneficiary population about market wages,
- Use data on women's wages from a recent labor force survey, and
- Use the average unskilled wage rate for women from other secondary sources.

Table 10 shows the diverse and inconsistent approaches MCC has used in valuing the time savings from water supply projects in different countries.

TABLE 10. HOW MCC VALUED WOMEN'S TIME SAVINGS IN WATER SUPPLY PROJECTS	
Country	Time savings valued at
Georgia	The estimated informal wage rate for women
Ghana	Half the administratively set national minimum wage
El Salvador	
Lesotho	
Mozambique	The average wage as shown through a consumption survey
Zambia	The average women's wage in urban Lusaka, discounted by the urban Lusaka unemployment rate for women

The MCC guidelines recommended valuing the time saved by children at the same wage rate applied to women's time. However, USAID should not adopt this assumption in a conservative economic analysis. Osborne (2019) noted the lack of data on children's market wage rates and the opportunity cost of missing education and other enrichment activities. The author also mentioned the MCC practice of substituting time spent by children collecting water with women's time. There is no empirical evidence to support this assumption, disconnected from whether children are even enrolled in school. This approach does not distinguish any differences in the value of time spent by children of different ages. Studies of the economic cost of fuelwood collection time in rural areas of developing countries have often placed lower or even zero shadow prices on children's time.

### TRAVEL TIME SAVINGS

The value of travel time savings is challenging to assess because people often do not perceive commuting as work or leisure time but as something in between. Most studies analyzing the value of travel time savings are based on stated preference approaches and have been conducted for large cities in high-income countries. The reported value of travel time savings varies by the mode of transport and whether the time is spent in free-flowing or congested traffic (U.S. Department of Transportation 2016; Whittington and Cook 2019). Surveys have often found a much higher perceived disutility for time spent waiting for public transit to arrive than time in moving vehicles. It is easier to read, relax, or check phones or computers with less interruption and time anxiety while sitting in a moving vehicle than standing at a waiting stop. Table 11 summarizes some estimates of the value of travel time savings.

TABLE 11. SUMMARY OF VALUE OF TRAVEL TIME SAVING ESTIMATES		
Category	Shadow price value	References
A. Road Transport		
Unpaid travel time and leisure time travel	50 percent of the average after-tax wage rate	Waters (1996); von Wartburg and Waters (2004)
Travel time paid by employers	100 percent of the before-tax wage rate with fringe benefits	
B. Multipliers for Congested Roads (Compared to Free-flowing Traffic)		
Light congestion	1.2	Wardman and Ibanez (2012) for the United Kingdom and the United States.
Heavy congestion	1.3	
Stop-start traffic	1.5	
Gridlock	1.8	
C. Multipliers for Other Transport Modes ( Compared to Time in Automobile)		
Buses	1.2	Abrantes and Wardman (2011) for the

**TABLE 11. SUMMARY OF VALUE OF TRAVEL TIME SAVING ESTIMATES**

Category	Shadow price value	References
Airplanes	1.8	United Kingdom
Trains	1.1	
D. Multipliers for Walking, Waiting, and Congestion (Compared to Time on Transit Vehicles)		
Walking	2.0	von Wartburg and Waters (2004) for Canada
Waiting	2.5	
Congestion	2.0	

SOURCE: Adapted from Boardman et al. (2018).

Fosgerau (2019) emphasized the difference in marginal utility between time spent at work and time spent in the car. The author suggested that the value of travel time is lower than the net wage rate by a factor representing the productivity difference between time used out of the car and time used in the car. Fosgerau cited the observations by Ho et al. (2015) and Lu et al. (2018) and offered an upper bound of 25 percent for the reduction in the value of travel time from not having to drive.

### UNPAID HOUSEHOLD WORK

Unpaid household work includes time spent shopping, collecting free products, cooking, cleaning, child care, routine eldercare, and complex care for people with chronic illnesses or disabilities. The value of this time should be considered in a financial or economic analysis from a societal perspective. When unpaid household work is valued, CBA and CEA findings can be substantially different (Goodrich et al. 2012; Krol et al. 2015; Sanders et al. 2016; Grosse et al. 2019; Lin et al. 2019).

Engel et al. (2021) reviewed 63 economic evaluations, 45 cost-of-illness studies, and three stated-preference studies and identified three main methods for valuing the time of informal caregivers. Approximately 92 percent of these studies were in high-income countries in Europe or North America. The approaches used in these studies are listed below in decreasing order of frequency:

- Replacement costs (45 percent),
- Opportunity costs (32 percent),
- Multiple methods (14 percent), and
- Stated preferences based on willingness to pay (3 percent).

The total is less than 100 percent because some studies did not report their valuation methods.

Replacement costs and opportunity costs are revealed preferences methods. The *replacement cost* (proxy service) method values unpaid caregiver time at the cost that would have been incurred for hiring paid caregivers as a substitute for informal personal care, housework, and supervision activities. The *opportunity cost* approach values the work time of unpaid caregivers and leisure time at some percent of the wage rate for foregone paid work. It assumes full employment for all workers who want to join the labor force

as well as perfect information and nondiscriminatory labor markets. Data availability is often challenging for the opportunity cost approach, especially in low- and middle-income countries with a high degree of labor informality, extensive unemployment and underemployment, and remote locations.

Most applications of the opportunity cost approach have been in high-income countries, raising questions about their relevance for low-income countries. Most relied on a single unit cost based on the average national or minimum wage. However, hired caregivers typically earn more than the opportunity cost of unpaid household caregivers because they often have more education, better skills, and more experience.

Since the average national wage is likely to be skewed by high outlier wage rates in the largest cities, the median may be more representative than the mean but is still likely inaccurate for rural and small urban areas. The minimum wage is a more appropriate measure of the marginal cost of time for unemployed people than the average wage. The assessment team recommends using the opportunity cost approach with a minimum wage rate. Some countries may have subnational or local minimum wages. If not, an adjustment factor can be applied to reduce the national minimum wage in areas where the prevailing wages are lower and statutory minimum wage rates are not applicable or effectively enforced. This adjusted minimum wage approach has been used in some CBAs for water supply investments in low- and middle-income countries.

**Most of the replacement cost and opportunity cost studies from high-income countries have valued unpaid household labor at around half the hired labor wage rate and leisure time at one-third of the wage rate.** The replacement and opportunity cost approaches do not account for the utility and disutility of specific caregivers or groups.

Only a few studies have used stated preference approaches such as contingent valuation or tradeoff (conjoint) analysis to value unpaid work or forgone leisure time in high-income countries. As discussed earlier, stated preferences can be based on either maximum WTP or minimum WTA, and this choice can greatly affect the results. It is also critical to consider the more questionable validity, reliability, and potential bias of stated preferences approaches.

Table 12 compares the guidelines on valuing unpaid labor and leisure time adopted or proposed by some governmental or multilateral organizations.

TABLE 12. ORGANIZATIONAL GUIDELINES FOR VALUING UNPAID LABOR AND LEISURE TIME	
ORGANIZATIONS	NOTES
UK Government - HM Treasury (2022)	<ul style="list-style-type: none"> <li>Recommended specific values<sup>34</sup> for time savings in CBA of transport policies.</li> </ul>
OECD - Directorate Responsible for Strategy, Better Regulation and Corporate Governance in the Secretariat-General (2021)	<ul style="list-style-type: none"> <li>Recommended the cost-savings approach to valuing in-work travel time -- the pretax wage rate plus the overhead costs associated with the employment of an extra unit of labor.</li> <li>Advised evaluating nonwork travel time at a share of the work-related value, following the literature estimating nonworking time value between 25 percent and 40 percent of the value of work time.</li> </ul>

<sup>34</sup> See the Transport Analysis Guidance data book: <https://www.gov.uk/government/publications/tag-data-book> (accessed December 19, 2022).

**TABLE 12. ORGANIZATIONAL GUIDELINES FOR VALUING UNPAID LABOR AND LEISURE TIME**

ORGANIZATIONS	NOTES
Millennium Challenge Corporation (2019)	<ul style="list-style-type: none"> <li>Value the time-saving benefits of water supply investments at an average wage for unskilled women's labor and also apply that to children's labor.</li> </ul>
USAID (2015) CBA Guidelines	<ul style="list-style-type: none"> <li>Value hired and unpaid household labor at government-mandated minimum wage rate, where applicable.</li> <li>Where there are substantial labor market distortions, conduct sensitivity analyses at other wage rates below the minimum wage.</li> </ul>
Asian Development Bank (2013, 2017)	<ul style="list-style-type: none"> <li>Disaggregate time-saving benefits for unpaid work and leisure time</li> <li>Value work time savings at the hourly wage rate</li> <li>Value leisure time benefits at some proportion of the hourly wage.</li> <li>Value the time savings from water supply investments at a percent of the casual daily unskilled wage rate in the locality adjusted by the economic opportunity cost of labor (EOCL).</li> <li>Use benefit transfer methods to extrapolate data to other contexts.</li> </ul>
French Policy Planning Commission (2013)	<ul style="list-style-type: none"> <li>Distinguish between intra- and inter-urban transport and consider the trip purpose, distance, mode (bus/train/automobile), and activity (walking, waiting, transferring).</li> </ul>
Norwegian Ministry of Finance (2012)	<ul style="list-style-type: none"> <li>Both references recommended valuing the lost production during paid travel time at the employers' pre-tax wage rate with fringe benefits.</li> <li>The references advised valuing unpaid travel time and forgone leisure time at 100 percent of the post-tax wage rate, including fringe benefits.</li> </ul>
U.S. Department of Health and Human Services (2017)	

SOURCE: Adapted from Whittington and Cook (2019).

## RECOMMENDATIONS

- 1. USAID's revised CBA guidelines should encourage using conservative, lower-bound wage rates for paid and unpaid work that are location specific. At a minimum, analyses should distinguish between urban and rural wage rates. Ideally, they should also account for significant subnational differences within countries.** The lowest average wage for casual, daily agricultural work is recommended in rural areas. It may vary for men and women. Some countries have a mandated minimum wage that can be a good proxy wage rate if more specific information is unavailable. However, minimum wage laws may only be applicable or enforceable for formal sector workers in urban areas. Wage rates are likely lower for informal sector workers in urban areas. Wage rates may also be lower in the less developed parts of a country where USAID often focuses.
- 2. The assessment team recommends valuing unpaid household work at 50 percent of the after-tax wage rate in the base-case scenario and conducting sensitivity analyses at 25 and 75 percent of the after-tax wage. The assessment team recommends adjusting average wage data to remove taxes or other payments not usually received by the targeted beneficiary groups.**
- 3. The assessment team recommends valuing adults' leisure time on a case-by-case basis at 0-25 percent of the after-tax wage rate in the base-case scenario. For a more conservative analysis, the assessment team recommends assigning no economic**

value to leisure time in sensitivity testing in countries or subnational areas with high unemployment or underemployment on a case-by-case basis

4. **The MCC WASH guidance value the time saved by children at the same wage rate that applies to women's time. However, the assessment team recommends that USAID not adopt this assumption in a conservative economic analysis.**
5. **EMD can collaborate with other USAID technical offices and bureaus on sector-specific guidance and cross-cutting knowledge products on valuing changes in time use in different types of allocations.** People might not consistently place the same value on different types and uses of time, as behavioral economics has shown.



## 9. INTEGRATING GENDER

USAID commissioned an external report on integrating gender in CBA and CEA (Watt et al. 2017). This report emphasized that mainstreaming gender in CBA required understanding how international development assistance interventions interact with existing gender gaps and cultural norms that are context-specific and complex. Development assistance interventions can reduce or widen gender gaps, and change or intensify adverse cultural norms. They often fail to achieve their intended objectives when gender gaps and cultural norms are not adequately addressed.

Watt et al. (2017) discussed the importance of identifying the channels of interaction, identifying and screening impacts, and monetizing the included impacts, but the report lacked sufficient practical examples. The authors noted that different approaches to the monetary valuation of gender impacts were of varying validity. They concluded that intangible (non-market) effects should only be monetized in a CBA if they changed the findings and conclusions. Since this report was prepared, new evidence has become available on the relationship between development assistance interventions and gender gaps and cultural norms.

The National Strategy on Gender Equity and Equality (White House 2021a) reiterated the importance of integrating gender in all USAID analyses, including CBA. However, this strategy did not provide technical guidance on integrating gender equity and equality in economic analysis.

The limited available evidence on identifying, quantifying, and monetizing the relevant costs and benefits is a critical constraint to integrating gender into CBA. EMD can help bridge these gaps:

1. Helping to ensure that microeconomic and macroeconomic analyses and evaluations consider gender gaps and cultural norms and reflect existing sector-specific evidence. Such evidence remains scattered and poorly documented. However, the continued collection and dissemination of such evidence in sector-specific guidelines can save significant time for CBA practitioners.
2. Identifying and filling knowledge gaps on the relationship between gender and culture in economic growth activities.
3. Valuing gender-related impacts of economic growth, participation in the paid and unpaid labor force, and reductions in gender-based violence in CBAs. EMD can expand coverage of non-market valuation methods for gender inclusion and empowerment in the revised CBA Guidelines and share key references on these topics.
4. Providing on-demand support for integrating gender and other aspects of social inclusion in activity designs, evaluations, and other knowledge and learning dissemination products.
5. Highlighting practical challenges and solutions to inform sector-specific guidance in conjunction with other technical offices and bureaus.
6. Update Watt et al. (2017) and include more practical examples for economists, other specialists, and generalists.

## ANNEX A: KII INSTRUMENTS

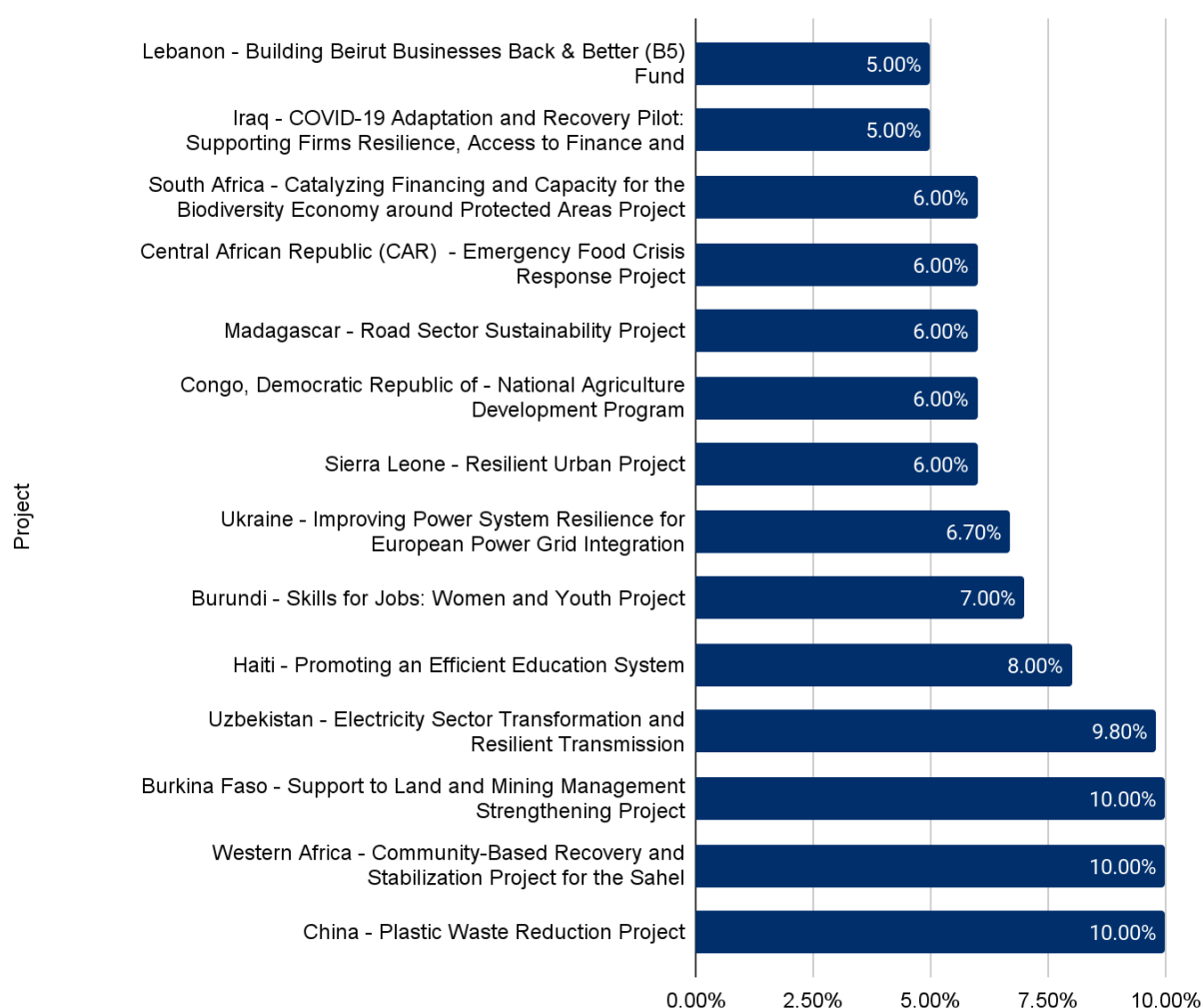
TABLE A 1: KII INSTRUMENTS BY INFORMANT TYPE					
	USAID	Other Institutions (USG)	Other Institutions (non-USG)	Individual Experts	IWG SC-GHG
General CBA	Use and role of CBA at USAID	Use and role of CBA at [institution]		Use and role of CBA at development assistance organizations	
CBA Guidelines	CBA Guidelines at USAID	CBA guidance at [institution]		CBA guidance at development assistance organizations	
Technical (as applicable)	Discount rate				
	Ecosystem Services				
	Social Cost of Carbon (USG)		Social Cost of Carbon (non-USG)		Social Cost of Carbon (IWG SC-GHG)
	Value of a Statistical Life				
	Valuation of Time-Use				

## ANNEX B: DISCOUNT RATES IN 14 RECENT WORLD BANK PROJECTS

Using a review of the World Bank's recent projects, which were selected based on the following criteria:

- Latest 6 projects in each sector posted by the World Bank<sup>35</sup>,
- Published in June and July of 2021,
- Accessed on Jan 10, 2022,
- Included a Project Appraisal Document, and
- Included a quantitative cost-benefit analysis.

**FIGURE B-1. DISCOUNT RATES IN RECENT WORLD BANK ANALYSES**



<sup>35</sup> Agriculture, Education, Energy & Extractives, Financial Sector, Health, Industry & Trade/Ser, Info & Communication, Public Admin, Social Protection, Transportation, and Water/Sanit/Waste. <https://projects.worldbank.org/> (accessed December 19, 2022).

**TABLE B 1. RECENT WORLD BANK ANALYSES REVIEWED**

<b>Project identifier</b>	<b>Appraisal Document Date</b>	<b>Project</b>	<b>Sector</b>
PI76013	July 30, 2021	Lebanon - Building Beirut Businesses Back & Better (B5) Fund	Financial Sector
PI74273	June 25, 2021	Iraq - COVID-19 Adaptation and Recovery Pilot: Supporting Firms Resilience, Access to Finance and Growth	Financial Sector
PI70213	June 17, 2021	South Africa - Catalyzing Financing and Capacity for the Biodiversity Economy around Protected Areas Project	Agriculture / Industry & Trade / Services
PI76754	June 15, 2021	Central African Republic (CAR) - Emergency Food Crisis Response Project	Agriculture
PI76811	June 7, 2021	Madagascar - Road Sector Sustainability Project	Transportation
PI69021	June 4, 2021	Congo, Democratic Republic of - National Agriculture Development Program	Transportation
PI68608	June 3, 2021	Sierra Leone - Resilient Urban Project	Water / Sanitation/ Waste
PI76114	June 9, 2021	Ukraine - Improving Power System Resilience for European Power Grid Integration	Energy & Extractives / Transportation
PI64416	June 3, 2021	Burundi - Skills for Jobs: Women and Youth Project	Education
PI74707	June 25, 2021	Haiti - Promoting an Efficient Education System	Education
PI71683	June 2, 2021	Uzbekistan - Electricity Sector Transformation and Resilient Transmission	Energy & Extractives / Industry & Trade / Services
PI69267	June 8, 2021	Burkina Faso - Support to Land and Mining Management Strengthening Project	Agriculture / Energy & Extractives / Public Admin
PI73830	May 24, 2021	Western Africa - Community-Based Recovery and Stabilization Project for the Sahel	Industry & Trade/Services
PI74267	June 3, 2021	China - Plastic Waste Reduction Project	Water / Sanitation / Waste

# ANNEX C: SOW AND ASSESSMENT QUESTIONS

## ORIGINAL SCOPE OF WORK

### Background and Purpose

In August 2015, the USAID/Washington Economic Policy Office (now part of the Center for Economics and Market Development (EMD)) issued Guidelines for CBA. The Guidelines discussed good practices for developing CBA models as well as using and disseminating the findings. The Guidelines distinguished between economic and financial analyses. *Economic cost-benefit analysis* typically shows the impacts of investments or policies on national Gross Domestic Product, but can also be applied at a global or multi-country regional level. *Financial cost-benefit analysis* reflects the perspective of one or more particular stakeholder groups. The Guidelines provided recommendations on cost-benefit criteria, the selection of discount rates for economic and financial analyses, handling of inflation rates, use of economic conversion factors, sensitivity analyses, and other technical issues.

The Guidelines were *not* incorporated as an Agency-wide requirement specified in the ADS and were not linked to an ADS section as a supplemental resource. In 2015, the Economic Policy Office concluded that it would be best for the guidelines to be voluntary, rather than mandatory. The Guidelines were issued as an internal document for USAID staff. They were posted on an Agency intranet page on cost-benefit analysis that was linked to the Economic Policy Office intranet page and could also be found through the intranet search box feature. The Guidelines were promoted in many in-person and online staff trainings. They were not released as a public document on the Agency's public website or the Development Experience Clearinghouse. Nevertheless, the guidelines have also been followed by some contractors when USAID staff have advised them to do so and shared the document.

EMD is requesting consulting services under the LEAP-III task order for a review of the 2015 Guidelines for Cost-Benefit Analysis and recommendations for revisions and additional topics that could be added. The original impetus for this work was to review: 1) selection of discount rates for economic and financial analysis of USAID investments in developing countries and 2) address current USG guidance on including the social cost of carbon. However, EMD concluded that additional issues needed to be addressed or updated: 1) the social cost of premature mortality risks; 2) social cost of premature mortality risks; 3) valuation of biodiversity and other environmental impacts; and the 4) integration or linkages to other sectoral and cross-cutting guidance.

The team should review the 2015 guidelines in their entirety and proactively identify other issues. The team should also discuss the advantages and disadvantages of various alternatives for formalizing the guidance in USAID policies and procedures or publicizing them more widely. On January 20, 2021, President Biden directed the Office of Management and Budget (OMB) to review how it conducts regulatory oversight, including the standards it sets for cost-benefit analyses. To the extent possible, EMD would also like the team to gather information on the various changes that OMB is considering or might consider and their implications for the USAID CBA Guidelines.

### Selection of Discount Rates for Economic and Financial Analyses

**Purpose and Theories.** Discount rates are used to reflect differences in the time value of money. Nearly all economists agree that a dollar of cost or benefit in the future is not equivalent to the same

amount of money now and that the difference in value is a function of the amount of time between the present and future costs and benefits.

However, economists have different viewpoints on the theoretical basis for the selection of the discount rate and this has major practical implications for cost-benefit and cost-effectiveness analyses. There are three major schools of thought on the selection of the discount rate: 1) cost of government borrowing (interest rates on government bonds or other low-risk investments), 2) opportunity cost of capital in the national economy,, and 3) the social rate of time preference.

The first alternative compares the benefits of public expenditures to the cost of borrowed funds. The second alternative focuses on the highest alternative value of other potential private sector uses of the capital that are foregone when public expenditures are funded by tax revenues adjusted for risk. The third alternative tries to estimate a society's preference for time value of money. It has been cited as a justification for using a lower discount rate than the opportunity cost of capital. A small minority of economists have argued for zero discount rates to address intergenerational equity issues in a limited number of types of investment or regulatory decisions with very long-term impacts (including climate change).

**Domestic Investment and Policy and Regulatory Analyses.** OMB Circular A-4 focuses on regulatory analyses and notes that, "Future citizens who are affected by such choices cannot take part in making them, and today's society must act with some consideration of their interest...A second reason for discounting the benefits and costs accruing to future generations at a lower rate is increased uncertainty about the appropriate value of the discount rate, the longer the horizon for the analysis.... [With] important intergenerational benefits or costs you might consider a further sensitivity analysis using a lower but positive discount rate in addition to calculating net benefits using discount rates of three and 7 percent."

OMB Circular A-94 addresses guidelines and discount rates for cost-benefit analysis of Federal programs. The USG has used three different levels of discount rates, depending on whether the purpose of the analysis was for 1) domestic investments and regulations, 2) cost-effectiveness or leasing decisions, or 3) Federal water and related land resources planning and investments.

OMB Circular A-94 recommended that constant dollar cost-benefit analyses of proposed domestic investments and regulations use a real discount rate of 7 percent. This rate was set to approximate the marginal pretax rate of return on an average private sector investment and was supposed to be changed in future updates, but it has not been changed. OMB Circular A-94 also called for sensitivity analysis at other discount rates, based on the specific economic characteristics of the program or project. For example, it recommended a higher discount rate than 7 percent in analyzing a regulatory proposal that could reduce business investment.

OMB Circular A-94 also stated that cost-effectiveness, leasing, and related analyses should use the U.S. Treasury borrowing rate on marketable securities of comparable maturity to the period of analysis. Analyses based on future nominal costs should use the nominal Treasury rates while those in constant-dollar costs should use the equivalent real rates (net of inflation). OMB updates discount rate guidance annually as an annex to Circular A-94. The most recent guidance (for Fiscal Year 2021 issued in November 2020) specified rates for time periods ranging from three to 30 years. For 30-year Treasury bonds, the nominal interest rate was 1.7% and the real interest rate was negative 0.3 percent.<sup>36</sup>

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<sup>36</sup> [https://www.whitehouse.gov/wp-content/uploads/2020/12/2020\\_Appendix-C.pdf](https://www.whitehouse.gov/wp-content/uploads/2020/12/2020_Appendix-C.pdf) (accessed December 19, 2022).

The Water Resources Planning Act of 1965 and the Water Resources Development Act of 1974 required the Bureau of Reclamation in the Department of the Interior to make an annual determination of the discount rate to be used in Federal water and related land resources planning and investments. Section 80(a) of Public Law 93–251 (88 Stat. 34), and 18 CFR 704.39 required the Bureau of Reclamation to base the discount rate determination for water resources planning on the average yield of marketable, interest-bearing USG securities with a maturity of 15 years or more in the preceding fiscal year, rounded to the nearest 0.125 percent. The law also limits annual increases or decreases to 0.25 percent. For many years, this rate was three percent. This lower rate was deemed appropriate for longer time investments in large-scale hydropower and flood control impoundments. This rate was 2.75 percent in FY 2020 and is 2.5 percent for FY 2021.

**USAID CBA Guidelines on Discount Rates.** Following a review of discount rates used in 2015 by the World Bank, Asian Development Bank, Inter-American Development Bank, and Millennium Challenge Corporation, the USAID CBA Guidelines recommended a 12 percent real (inflation-adjusted) discount rate for economic analyses. The 2015 Guidelines noted that it may not be appropriate to use the 12 percent discount rate in all economic analyses and encouraged sensitivity analyses on other discount rates. To date, the Guidelines have primarily been applied to agriculture and infrastructure projects, but have also been used in renewable energy and forestry and land use analyses for climate change mitigation and adaptation. The existing guidelines stated that sensitivity and scenario analysis should show how different discount rates can affect the findings.

The existing USAID Guidelines also encouraged use of a different discount rate in financial cost-benefit analysis based on the cost of loan financing available to the specific stakeholders who would be making the investments. Since cost-benefit analyses typically use *real* (inflation-adjusted) values for future costs and benefits, the projected inflation rate component should be removed from the nominal loan financing cost. In some cases, the inflation adjustment may result in negative, real discount rates for a financial analysis, particularly if interest rates are regulated by the government or projected inflation rates are high.

This financing cost approach is ambiguous because loan financing may be available from concessional or commercial sources with different loan tenors. Financing may also be available from grants or equity investments. In some cases, bank loans may not be available to certain stakeholder groups due to high perceived risks, lack of credit history, or high transaction costs for relatively small loans to a large number of people, especially in remote areas.

**Continuing Controversy Over Discount Rates.** At the 12 percent discount rate recommended in the 2015 USAID guidelines, it can be difficult to justify slow-maturing investments with long-term benefits or place much value on reducing long-term costs or negative impacts. At this discount rate, \$1 in 25 years has a present value of just \$0.06 and \$1 in 50 years has a present value of only \$0.003. The 12 percent discount rate places essentially no value on economic or environmental benefits or costs that occur after 28-30 years. Many USAID projects can have impacts that last longer than 20 or 30 years.

Many economists would agree that discount rate decisions should be periodically reviewed to reflect changing economic conditions. This argument is relevant for all three of the alternative theories on discount rates -- the cost of government borrowing, opportunity cost of capital in the economy, or the social rate of time preference.

Some economists and technical experts have argued for substantially lower discount rates for health and environmental (particularly climate-related) investments, which typically have very long benefit streams. Otherwise, these long-term impacts tend to be undervalued in cost-benefit analyses, leading to distorted investment and policy decisions.

Globally, many economic analyses of health have used a three percent real discount rate. The discount rate issue is particularly problematic for carbon emissions that persist in the atmosphere and affect global climate for [300-1,000 years](#). Some notable economists have recommended use of lower or even zero percent discount rates for economic analyses of GHG emission reductions (Goulder and Williams 2012).

Since 2015, some multilateral development banks have changed their discount rate policies by applying a lower discount rate for certain project types or sectors. For example, the World Bank has applied standard rates of 10-12 percent, while using a lower rate of 6 percent for some types of projects, including renewable energy development. The Asian Development Bank<sup>37</sup> was using a standard discount rate of 9 percent and a lower discount rate of 6 percent in projects for poverty alleviation, pollution control, protection of the ecosystem, flood control, and control of deforestation. The Inter-American Development Bank ([IADB](#)) has also questioned the use of a standard discount rate across all development projects.

Similarly, one option to consider is whether USAID should use a lower discount rate for certain types of projects or sectors than for others. However, many economists would argue that it would be inadvisable to use different discount rates for different sectors or types of investments because it would lead to distortions in the allocation of capital across economic sectors or types of projects. Another option to consider would be reducing the current 12 percent discount rate for economic analyses for all types or sectors of projects. The cost of government borrowing and the opportunity cost of capital have changed since 2015. It is difficult to say whether the social rate of time preference has changed, but there is increasing awareness of the long-term risks of climate change.

### **New and Changing USG Guidance on the Social Cost of Carbon**

On February 26, 2021, the Biden Administration announced that USG agencies will be expected to apply a preliminary SCC of \$51 per metric ton of carbon dioxide equivalent (t/CO<sub>2</sub>e).<sup>38</sup> This preliminary value was produced by simply applying an inflation adjustment to a U.S. Environmental Protection Agency (EPA) estimate prepared during the Obama Administration, which was based on a three percent discount rate. At that time, the EPA had also estimated the social cost of carbon at other discount rates and the values were very sensitive to this assumption. These estimates were based on the estimated **worldwide** costs imposed by carbon dioxide emissions (not an easy task).

Since the social cost of carbon is expected to rise over time with increasing GHG emissions, the EPA previously produced these estimates for different base years. For the same reason, the USG will need to update SCC estimates for future base years. Other reasons why future SCC revisions will be necessary include improvements in GHG emission factor data and scientific understanding and modeling of

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<sup>37</sup> <https://www.adb.org/sites/default/files/institutional-document/32256/economic-analysis-projects.pdf> (accessed December 19, 2022).

<sup>38</sup> <https://www.scientificamerican.com/article/cost-of-carbon-pollution-pegged-at-51-a-ton/> (accessed December 19, 2022).



atmospheric transport and transformation of GHGs, GWP, and climate risks; feedback effects from climate changes, and the impacts and costs of climate risks.

A Federal interagency working group was established in 2021 to consider future revisions of the social cost of carbon. Heather Boushey, a member of the Council of Economic Advisers, stated that the interagency working group might look beyond the Treasury bond yield in selecting the discount rate for the social cost of carbon to help ensure environmental justice and intergenerational equity. In the United States, use of a lower discount rate for estimating the social cost of carbon than in other regulatory analyses could bring criticism on inconsistency of policies and standards and increase the risks of losing court cases.

The 2015 USAID CBA Guidelines do not provide any references or recommendations regarding the social cost of carbon (SCC). However, USAID must comply with USG policies for including this cost of these negative, global externalities. On an ad hoc basis, USAID has asked contractors to include the social cost of carbon in several CBAs over the past few years. In the interim between the prior and current USG guidance on the SCC, a USAID Activity Manager recommended that these CBAs use four different carbon prices ranging from \$0 to \$25/tCO<sub>2</sub>e, following a review of EU compliance market and U.S. voluntary markets.<sup>39</sup> After the current preliminary USG revision of the SCC, the USAID Activity Manager asked the contractor to apply the \$51/tCO<sub>2</sub>e cost in the base case (Matek et al. 2021b).

The first step in quantifying the social cost of carbon is to convert other greenhouse gas emissions to carbon dioxide equivalents based on their relative global warming potentials (GWP). The GWP conversion factors vary with the time period, but 100-year global warming potentials are most commonly used in policy analyses. Carbon dioxide remains in the atmosphere for 300–1,000 years.<sup>40</sup> By definition, CO<sub>2</sub> has a global warming potential of 1.0. The equivalents from other greenhouse gases (GHGs) are presented as ranges due to variable effects and uncertainties.

The 100-year GWP is 28–36 for methane (CH<sub>4</sub>) and 265–298 for nitrous oxide (N<sub>2</sub>O). It can be in the thousands or tens of thousands for chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), hydrochlorofluorocarbons (HCFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>).<sup>41</sup> It would be reasonable to use the midpoints of these GWP ranges, but a more conservative analysis might use the high conversion factors. It is important to include these other GHGs in economic analyses, where relevant, because of their high GWPs. For example, methane emissions are particularly relevant in production and distribution of natural gas, ruminant livestock production, and land flooding for paddy rice or construction of large reservoirs. Nitrous oxide emissions are particularly relevant from internal combustion engines and nitrogen fertilizers. USAID has considered the social cost of other GHG emissions in a few CBAs.<sup>42</sup>

### **The Social Cost of Premature Mortality Risks**

The USAID CBA Guidelines do not address the critically important issue of valuing premature mortality risks in an economic analysis. The *value of a statistical life* is a common, but controversial, method for estimating the average amount of money that adults in a country would be willing to pay for a marginal reduction in the risk of premature death or willing to accept for a marginal increase in the risk. The

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<sup>39</sup> For example, Smith et al. (2020).

<sup>40</sup> <https://climate.nasa.gov/news/2915/the-atmosphere-getting-a-handle-on-carbon-dioxide/> (accessed December 19, 2022).

<sup>41</sup> <https://www.epa.gov/ghgemissions/understanding-global-warming-potentials> (accessed December 19, 2022).

<sup>42</sup> Two examples: Matek et al. (2021) and Ng'ang'a et al. (2020).

value of a statistical life can be estimated with *stated preference* methods, such as surveys or bidding games. It can also be estimated with *revealed preference* methods, such as wage differentials for occupations with higher premature mortality risks (Bosworth, Hunter, and Kibria 2017; Kniesner and Viscusi 2019). Most economists consider revealed preference measures to have greater validity and reliability and fewer systematic biases than stated preference measures.

There is no standard USG guidance on the value of a statistical life in regulatory and policy decision making. Quite different estimates have been used by the US EPA, US Department of Transportation, and other agencies.

## **Valuation of Biodiversity and Other Environmental Impacts**

In 2019, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystems Services issued a major global assessment in response to a request from the Conference of the Parties of the Convention on Biological Diversity (CBD). This report addressed the status and trends with regard to biodiversity and ecosystem services, the impact of biodiversity and ecosystem services on human well-being and the effectiveness of responses (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services - IPBES 2019). In 2021, the U.K. Government issued a major report on the Economics of Biodiversity (Dasgupta 2021). One of the main recommendations was the importance of changing measures of economic success to contribute to a more sustainable development path.

Also in 2021, the World Bank estimated that the collapse of ecosystem services (such as wild pollination, provision of food from marine fisheries and timber from native forests) could reduce global GDP of \$2.7 trillion annually by 2030. By that year, the annual loss in real GDP could be 9.7 percent in Sub-Saharan Africa and 6.5 percent in South Asia. The largest share of the losses would be from forest products in Sub-Saharan Africa and pollinated crops in South Asia (Johnson et al. 2021).

USAID has recognized the importance of these issues for some time. In 2018, the USAID/Washington Forest and Biodiversity Office (now part of the Biodiversity Center) commissioned a contractor report on valuing biodiversity and other environmental impacts in cost-benefit analysis (Kashi et al. 2018). However, no changes were made in the USAID CBA guidelines following publication of that report.

USAID has reviewed economic techniques for valuation of mangrove ecosystems and biodiversity (Smith et al. 2018). USAID has also offered occasional staff trainings that included material on environment and natural resource economics.<sup>43</sup> The Sharing Environment and Energy Knowledge (SEEK) Activity led by TRG is working with a USAID economist to prepare two online training modules based on that training.

## **Integration or Linkages to Other Sectoral and Cross-Cutting Guidance**

USAID has also issued sector-specific guidance on CBAs in gender, resilience, and education (Watt et al. 2017). The Millennium Challenge Corporation has issued guidance on CBAs in some additional sectors, such as land and WASH (Bowen and Negeleza 2019; Osborne 2019).

### **General Research Question:**

How should USAID revise the content and use of the current general CBA Guidelines and other sectoral and cross-cutting guidance to reflect good practices for cost-benefit and cost-effectiveness analysis across USAID's key development sectors under the current context?

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<sup>43</sup> For example, a two-week course on Economics and Planning for Climate Change Mitigation and Adaptation, held in Mozambique.

## Specific Research Questions

1. What are the potential changes in OMB policies on standards for CBAs, including selection of discount rates? What are their implications for USAID cost-benefit analyses?
2. What are the current discount rates used in cost analysis and cost-effectiveness analysis for USAID in education, health, environment and climate change, and other program areas?
3. What are the current discount rates used in cost-benefit analyses by 1) USG agencies that work in developing countries (including DFC, MCC, TDA, 2) other major bilateral and multilateral donors, and 3) multilateral development banks? Do these discount rates differ for economic and financial analyses? Do these rates differ by economic sector or principal types of benefits? Do these rates differ if funds are a) earmarked for a specific sector and b) must be spent in a defined time period?
4. Should USAID revise its current guidelines on discount rates in economic and financial cost-benefit analysis? How often should it review these rates? Who are the internal USAID stakeholders who should be consulted when making these periodic updates? Should USAID recommend use of different discount rates across economic sectors or principal types of benefits (especially health and the environment and climate change)?
5. Should USAID recommend use of these same standard discount rates in analyzing partner country policies and regulatory decisions or discount rates used by partner governments?
6. The usual practice in CBA is to estimate all costs and benefits in current monetary values and use a real (inflation-adjusted) discount rate. Inflation then affects future costs and benefits equally and washes out of the net present value calculations. Some CBAs have assumed higher average annual cost increases for a specific commodity than the general inflation rate (for example; to reflect increasing scarcity of petroleum or wood products over time). In those cases, only the differential over the general inflation rate should be used as the price escalation factor. However, it is quite difficult to predict future differential inflation rates and this requires close scrutiny because it can be used to manipulate CBA results. How should the USAID CBA Guidelines address this issue?
7. Should a risk premium be included in the discount rate or should risks be addressed in estimates of benefit and cost streams in the base case and sensitivity analyses? Should the time horizon of an analysis enter into the risk estimates?
8. How should uncertainty over possible future cost changes due to new or improved technologies be addressed? How should uncertainty over the magnitude of future climate changes and their impacts be addressed?
9. What changes are needed to ensure that the Agency CBA Guidelines are consistent with USG policies and requirements for incorporating the social cost of carbon? How can USAID effectively ensure use of the USG SCC values? Since the SCC values are expected to change, how should USAID inform staff and implementing partners about these changes?
10. What are the current practices of various USG agencies on estimating the value of a statistical life? How should the CBA Guidelines be revised to estimate the value of a statistical life when premature mortality risks are increased or reduced?
11. How should the CBA Guidelines be revised to address the costs and benefits of biodiversity and other ecosystem services?

12. Should the general USAID CBA guidelines be revised to incorporate or reference other USAID and MCC sectoral and cross-cutting guidance on financial and economic analyses? To what extent is the MCC sectoral guidance applicable for USAID? Are there additional issues that should be included in the general USAID CBA guidelines that have not yet been addressed in existing USAID or MCC sectoral or cross-cutting guidance?

13. Should these guidelines be formalized into USAID policies and procedures, such as in a mandatory or supplemental reference to an ADS chapter? How can the USAID guidelines on cost-benefit analysis be more widely publicized within the Agency and externally?

## ASSESSMENT QUESTIONS AND REPORT SECTIONS

TABLE C 1. ASSESSMENT QUESTIONS AND REPORT SECTIONS	
Assessment Questions	Report Section
1. What are the potential changes in Office of Management and Budget (OMB) policies on standards for CBAs, including selection of discount rates? What are their implications for USAID cost-benefit analyses?	2. The Role of CBA At USAID
2. What are the current discount rates used in CBA and CEA conducted by or for USAID in education, health, environment and climate change, and other program areas?	4. The Discount Rate
3. What are the current discount rates used in cost-benefit analyses by 1) USG agencies that work in developing countries (including Development Finance Corporation – DFC, MCC, and Trade and Development Agency – TDA, 2) other major bilateral and multilateral donors, and 3) multilateral development banks? Do these discount rates differ for economic and financial analyses? Do these rates differ by economic sector or principal types of benefits?	
4. Should USAID revise its current guidelines on discount rates in economic and financial cost-benefit analysis? How often should it review these rates? Who are the internal USAID stakeholders who should be consulted when making these periodic updates? Should USAID recommend the use of different discount rates across economic sectors or principal types of benefits (especially health and the environment and climate change)?	
5. Should USAID recommend the use of these same standard discount rates in analyzing partner country policies and regulatory decisions or discount rates used by partner governments?	
6. The usual practice in CBA is to estimate all costs and benefits in current monetary values and use a real (inflation-adjusted) discount rate. Inflation then affects future costs and benefits equally and washes out of the net present value calculations. Some CBAs have assumed higher average annual cost increases for a specific commodity than the general inflation rate (for example, to reflect the increasing scarcity of petroleum or wood products over time). In those cases, only the differential over the general inflation rate should be used as the price escalation factor. However, it is quite difficult to predict future differential inflation rates and this requires scrutiny because it can be used to manipulate CBA results. How should the USAID CBA Guidelines address this issue?	9. Uncertainty and Risk
7. Should a risk premium be included in the discount rate or should risks be addressed in estimates of benefit and cost streams in the base case and sensitivity analyses? Should the time horizon of an analysis enter into the risk estimates?	4. The Discount Rate and 9. Uncertainty and Risk

**TABLE C I. ASSESSMENT QUESTIONS AND REPORT SECTIONS**

<b>Assessment Questions</b>	<b>Report Section</b>
8. How should uncertainty over possible future cost changes due to new or improved technologies be addressed? How should uncertainty over the magnitude of future climate changes and their effects be addressed?	9. Uncertainty and Risk
9. What changes are needed to ensure that the Agency CBA Guidelines are consistent with USG policies and requirements for incorporating the social cost of carbon? How can USAID effectively ensure the use of the USG SCC values? Because the SCC values are expected to change, how should USAID inform staff and implementing partners about these changes over time?	5. Social Cost of Carbon
10. What are the current practices of various USG agencies on estimating the value of a statistical life? How should the CBA Guidelines be revised to estimate the value of a statistical life when premature mortality risks are increased or reduced?	7. Value of a Statistical Life
11. How should the CBA Guidelines be revised to address the costs and benefits of biodiversity and other ecosystem services?	6. Ecosystem Service Valuation
12. How should the CBA Guidelines be revised to address the valuation of changes in time-use in the developing context? Specific examples include the value of time spent on unpaid care, job search, household farming activity, and transport (different modes) for unskilled labor.	8. Valuing Changes in Time Use
13. Should the general USAID CBA guidelines be revised to incorporate or reference other USAID and MCC sectoral and cross-cutting guidance on financial and economic analyses? To what extent is the MCC sectoral guidance applicable for USAID? Are there additional issues that should be included in the general USAID CBA guidelines that have not yet been addressed in existing USAID guidance?	3. 2015 CBA Guidelines: General Assessment and Recommendations
14. Should these guidelines be formalized into USAID policies and procedures, such as in a mandatory or supplemental reference to an Automated Directives System (ADS) chapter? How can the USAID guidelines on cost-benefit analysis be more widely publicized within the Agency and externally?	

## ANNEX D: SUMMARY DESCRIPTION OF SAMPLE FOR INTERVIEWS

Below is a summary that describes the sample (several individuals can be categorized under multiple characteristics listed below):

- USAID staff: 32
- Alumni of USAID-funded courses on CBA: 22
- USAID Washington-based: 12
- USAID Missions: 14
- Current or recent staff of other development assistance organizations
  - The World Bank: 2
  - The African Development Bank: 2
  - The Millennium Challenge Corporation: 7
  - The Asian Development Bank: 1
  - The Department of Transportation: 1
  - Conservation International: 1
- Expertise in
  - Ecosystem services and social cost of carbon: 14
  - Institutional aspects of USAID: 15
  - Discount rate: 19
  - Value of a statistical life: 6
  - Valuing changes in time use: 3

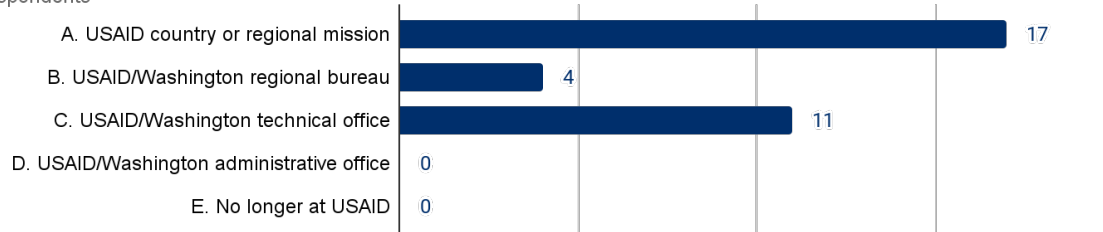
The group interviews preceded the KIIs. Group interview participants were the alumni of the month-long CBA courses at Duke and Queen's Universities who still work at USAID. Not all alumni participated in group interviews. Some were excluded intentionally and later interviewed as a part of KIIs. Others have either left USAID or did not respond to the request to participate in the group interviews. The USAID staff who participated in the group interviews or in KIIs were asked to participate in two polls. The first poll describes the current and past positions and their training on CBA before joining USAID.

The data resulting from the first poll is summarized in figures D-1 and D-2. The second poll asked questions about the participants' familiarity with the 2015 CBA Guidelines. The third section of this document includes the results of the second poll.

### Figure D-1. USAID interviewee poll results: Work experience before USAID

Before your current position, where have you worked for USAID since 2015 (check all that apply)?

26 respondents



### Figure D-2. USAID interviewee poll results: CBA training before USAID

Before working at USAID, did you have prior training on cost-benefit analysis?

26 respondents



## ANNEX E: USAID CBA REPORTS

TABLE E 1. USAID CBA REPORTS (2012-2021)		
Title	Year	Link (all accessed December 19, 2022)
Cost-Benefit Analysis of Charcoal and Wood Use for Household Cooking and Demand- and Supply-Side Alternatives for Forest Conservation in Lilongwe, Malawi	2021	<a href="https://pdf.usaid.gov/pdf_docs/PA00XFKQ.pdf">https://pdf.usaid.gov/pdf_docs/PA00XFKQ.pdf</a>
Cost-Benefit Analysis of Charcoal Use for Household Cooking and Demand- and Supply-Side Alternatives for Forest Conservation in Lusaka, Zambia.	2021	<a href="https://dec.usaid.gov/dec/content/Detail.aspx?VID=47&amp;ctID=ODVhZjk4NWQtM2YyMi00YjRmLTkxNjktZTcxMjM2NDBmY2Uy&amp;rID=NTgyOTM0">https://dec.usaid.gov/dec/content/Detail.aspx?VID=47&amp;ctID=ODVhZjk4NWQtM2YyMi00YjRmLTkxNjktZTcxMjM2NDBmY2Uy&amp;rID=NTgyOTM0</a>
Cost-Benefit Analysis of Improved Cacao Production Methods in Ghana.	2021	<a href="https://dec.usaid.gov/dec/content/Detail.aspx?VID=47&amp;ctID=ODVhZjk4NWQtM2YyMi00YjRmLTkxNjktZTcxMjM2NDBmY2Uy&amp;rID=NTc3MTg5">https://dec.usaid.gov/dec/content/Detail.aspx?VID=47&amp;ctID=ODVhZjk4NWQtM2YyMi00YjRmLTkxNjktZTcxMjM2NDBmY2Uy&amp;rID=NTc3MTg5</a>
Economic Analysis of the Conservation and Communities Project	2020	<a href="https://pdf.usaid.gov/pdf_docs/PA00WMGD.pdf">https://pdf.usaid.gov/pdf_docs/PA00WMGD.pdf</a>
PROPONTE MÁS Cost-Benefit Analysis	2020	<a href="https://pdf.usaid.gov/pdf_docs/PA00WPWT.pdf">https://pdf.usaid.gov/pdf_docs/PA00WPWT.pdf</a>
Cost-Benefit Analysis of Mangrove of Mangrove Conservation Versus Shrimp Aquaculture in Bintuni Bay and Mimika, Indonesia	2020	<a href="https://www.climatelinks.org/sites/default/files/asset/document/2020_USAID_CEADIR-Indonesia-Mangrove-CBA-Revised.pdf">https://www.climatelinks.org/sites/default/files/asset/document/2020_USAID_CEADIR-Indonesia-Mangrove-CBA-Revised.pdf</a>
Cost-Benefit Analysis of Improved Livestock Management Practices in the Oromia Lowlands of Ethiopia	2020	<a href="https://pdf.usaid.gov/pdf_docs/PA00X1KT.pdf">https://pdf.usaid.gov/pdf_docs/PA00X1KT.pdf</a>
Cost-Benefit Analysis of Improving the Tracking and Traceability of U.S. Food Aid	2020	<a href="https://pdf.usaid.gov/pdf_docs/PA00X57V.pdf">https://pdf.usaid.gov/pdf_docs/PA00X57V.pdf</a>
CEA of Food Transfer Modalities in Humanitarian Crises	2020	<a href="https://pdf.usaid.gov/pdf_docs/PA00X57K.pdf">https://pdf.usaid.gov/pdf_docs/PA00X57K.pdf</a>
Cost-Benefit Analysis of USAID Rwanda's Hinga Weze Activities	2020	<a href="https://pdf.usaid.gov/pdf_docs/PA00XDMN.pdf">https://pdf.usaid.gov/pdf_docs/PA00XDMN.pdf</a>
Cost-Effectiveness Analysis of USAID/Nigeria's Livelihoods Project	2018	<a href="https://pdf.usaid.gov/pdf_docs/PA00T4XB.pdf">https://pdf.usaid.gov/pdf_docs/PA00T4XB.pdf</a>
Cost-Benefit Analysis of USAID/Nigeria's Livelihoods Project: Agricultural Value Chains	2018	<a href="https://pdf.usaid.gov/pdf_docs/PA00T4XC.pdf">https://pdf.usaid.gov/pdf_docs/PA00T4XC.pdf</a>
Cost-Benefit Analysis of USAID/Zimbabwe Crop Development Program	2018	<a href="https://pdf.usaid.gov/pdf_docs/PA00TBXT.pdf">https://pdf.usaid.gov/pdf_docs/PA00TBXT.pdf</a>



**TABLE E 1. USAID CBA REPORTS (2012-2021)**

<b>Title</b>	<b>Year</b>	<b>Link (all accessed December 19, 2022)</b>
Cost-Benefit Analysis of USAID/Zimbabwe Livestock Development Program Final Report	2018	<a href="https://pdf.usaid.gov/pdf_docs/PA00TBXV.pdf">https://pdf.usaid.gov/pdf_docs/PA00TBXV.pdf</a>
Cost-Benefit Analysis of USAID Resilience in the Sahel Initiative	2018	<a href="https://pdf.usaid.gov/pdf_docs/PA00TC85.pdf">https://pdf.usaid.gov/pdf_docs/PA00TC85.pdf</a>
Cost-Benefit Analyses and Final Suggestions for Net-Metering in Serbia	2018	<a href="https://pdf.usaid.gov/pdf_docs/PA00W5ZF.pdf">https://pdf.usaid.gov/pdf_docs/PA00W5ZF.pdf</a>
Mangrove Ecosystem Valuation: Methods and Results	2018	<a href="https://pdf.usaid.gov/pdf_docs/PA00TC8C.pdf">https://pdf.usaid.gov/pdf_docs/PA00TC8C.pdf</a>
Feed the Future Cost-Benefit Analysis Synthesis Report	2017	<a href="https://pdf.usaid.gov/pdf_docs/PA00SWVV.pdf">https://pdf.usaid.gov/pdf_docs/PA00SWVV.pdf</a>
Integrating Gender in Cost-benefit and Cost-effectiveness Analysis	2017	<a href="https://limestone-analytics.com/wp-content/uploads/2020/06/Integrating_Gender_into_Cost_Benefit_Ana.pdf">https://limestone-analytics.com/wp-content/uploads/2020/06/Integrating_Gender_into_Cost_Benefit_Ana.pdf</a>
Rural Tourism “Economic Impact Analysis”	2017	<a href="https://pdf.usaid.gov/pdf_docs/PA00TPX5.pdf">https://pdf.usaid.gov/pdf_docs/PA00TPX5.pdf</a>
Cost-Benefit Analysis of Mangrove Restoration for Coastal Protection and an Earthen Dike Alternative in Mozambique.	2017	<a href="https://www.climatelinks.org/resources/cost-benefit-analysis-mangrove-restoration-coastal-protection-and-earthen-dike">https://www.climatelinks.org/resources/cost-benefit-analysis-mangrove-restoration-coastal-protection-and-earthen-dike</a>
Cost-Benefit Analysis of Off-Grid Solar Investments in East Africa	2017	<a href="https://pdf.usaid.gov/pdf_docs/PA00N5B7.pdf">https://pdf.usaid.gov/pdf_docs/PA00N5B7.pdf</a>
Cost-Benefit Analysis of USAID/Mali’s Sorghum and Millet Value Chain	2016	<a href="https://pdf.usaid.gov/pdf_docs/PA00M3KQ.pdf">https://pdf.usaid.gov/pdf_docs/PA00M3KQ.pdf</a>
Cost-Benefit Analysis of USAID/Liberia’s Rice and Goat Value Chain Interventions	2016	<a href="https://pdf.usaid.gov/pdf_docs/PA00M3KT.pdf">https://pdf.usaid.gov/pdf_docs/PA00M3KT.pdf</a>
Cost Benefit Analysis of USAID/Rwanda’s Dairy Value Chain Intervention	2016	<a href="https://pdf.usaid.gov/pdf_docs/PA00M3KJ.pdf">https://pdf.usaid.gov/pdf_docs/PA00M3KJ.pdf</a>
Cost Benefit Analysis of USAID/Senegal’s Rice Value Chain Interventions	2016	<a href="https://pdf.usaid.gov/pdf_docs/PA00M3KG.pdf">https://pdf.usaid.gov/pdf_docs/PA00M3KG.pdf</a>
Cost-benefit Analysis Report Maize - USAID/Nepal	2016	<a href="https://pdf.usaid.gov/pdf_docs/PA00MCMN.pdf">https://pdf.usaid.gov/pdf_docs/PA00MCMN.pdf</a>
Cost Benefit Analysis Report on On-Season Cauliflower	2016	<a href="https://pdf.usaid.gov/pdf_docs/PA00MCMP.pdf">https://pdf.usaid.gov/pdf_docs/PA00MCMP.pdf</a>
Cost-benefit and Effectiveness of Refrigerated Trucks for Transportation and Marketing of Fresh Produce	2016	<a href="https://pdf.usaid.gov/pdf_docs/PA00M6V6.pdf">https://pdf.usaid.gov/pdf_docs/PA00M6V6.pdf</a>

**TABLE E 1. USAID CBA REPORTS (2012-2021)**

<b>Title</b>	<b>Year</b>	<b>Link (all accessed December 19, 2022)</b>
U.S. – Pakistan Partnership for Agricultural Market Development (AMD): Financial Cost Benefit Analysis - June 2015	2015	<a href="https://2012-2017.usaid.gov/news-information/fact-sheets/us-pakistan-partnership-agricultural-market-development">https://2012-2017.usaid.gov/news-information/fact-sheets/us-pakistan-partnership-agricultural-market-development</a>
Cost-Benefit Analysis of USAID/Nigeria's MARKETS II Program	2015	<a href="https://www.usaid.gov/economic-growth-and-trade/cost-benefit-analysis">https://www.usaid.gov/economic-growth-and-trade/cost-benefit-analysis</a>
Integrating Cost Benefit Analysis (CBA) Indicators with the M&E Framework	2014	<a href="https://pdf.usaid.gov/pdf_docs/PA00K4C7.pdf">https://pdf.usaid.gov/pdf_docs/PA00K4C7.pdf</a>
Cost-benefit Analysis of the Meat Value Chain in Ethiopia	2013	<a href="https://pdf.usaid.gov/pdf_docs/PA00JP34.pdf">https://pdf.usaid.gov/pdf_docs/PA00JP34.pdf</a>
Cost-benefit Analysis of the Potatoes, Onions, and Tomatoes Value Chain in Ethiopia	2013	<a href="https://pdf.usaid.gov/pdf_docs/PA00JPSD.pdf">https://pdf.usaid.gov/pdf_docs/PA00JPSD.pdf</a>
Cost-benefit Analysis of the Dairy Value Chain in Ethiopia	2013	<a href="https://pdf.usaid.gov/pdf_docs/PA00JP32.pdf">https://pdf.usaid.gov/pdf_docs/PA00JP32.pdf</a>
Cost-benefit Analysis of the Commercial Slaughterhouse Facility Establishment Intervention	2013	<a href="https://pdf.usaid.gov/pdf_docs/PA00JS67.pdf">https://pdf.usaid.gov/pdf_docs/PA00JS67.pdf</a>
2013 Program on Cost-Benefit Cost-Effectiveness Analysis Queen's University	2013	
Cost-benefit Analysis of the Milk-Processing Plant Enchantment in Jijiga City, Ethiopia	2013	<a href="https://pdf.usaid.gov/pdf_docs/PA00JTJF.pdf">https://pdf.usaid.gov/pdf_docs/PA00JTJF.pdf</a>
Economic analysis of feed the future investments - Guatemala: Rural Value Chains Project – AGEXPORT	2013	<a href="https://www.jstor.org/stable/pdf/resrep23169.7.pdf">https://www.jstor.org/stable/pdf/resrep23169.7.pdf</a>
Economic analysis of feed the future investments - Guatemala: Rural Value Chains Project – Anacafe	2013	<a href="https://www.jstor.org/stable/pdf/resrep23169.7.pdf">https://www.jstor.org/stable/pdf/resrep23169.7.pdf</a>
Cost-benefit Analysis of Honey Value Chain in Ethiopia	2012	<a href="https://pdf.usaid.gov/pdf_docs/PA00JP31.pdf">https://pdf.usaid.gov/pdf_docs/PA00JP31.pdf</a>
Cost-benefit Analysis of the Red Haricot Beans Value Chain in Ethiopia	2012	<a href="https://pdf.usaid.gov/pdf_docs/PA00JP2Z.pdf">https://pdf.usaid.gov/pdf_docs/PA00JP2Z.pdf</a>
Cost-benefit Analysis of the White Pea Beans Value Chain in Ethiopia	2012	<a href="https://pdf.usaid.gov/pdf_docs/PA00JN6X.pdf">https://pdf.usaid.gov/pdf_docs/PA00JN6X.pdf</a>
Coffee Value Chain: Cost-benefit Analysis of Intervention	2012	<a href="https://pdf.usaid.gov/pdf_docs/PA00JN65.pdf">https://pdf.usaid.gov/pdf_docs/PA00JN65.pdf</a>

**TABLE E 1. USAID CBA REPORTS (2012-2021)**

<b>Title</b>	<b>Year</b>	<b>Link (all accessed December 19, 2022)</b>
Cost-benefit Analysis of the Family Farm Model in Far-West/Mid-West Erai in Nepal: Paddy Cultivation	2012	<a href="https://pdf.usaid.gov/pdf_docs/PNAEB694.pdf">https://pdf.usaid.gov/pdf_docs/PNAEB694.pdf</a>
Cost-effectiveness Analysis of USAID/Rwanda Feed the Future Project, Nutrition: Behavior Change and Social Marketing	2012	<a href="https://pdf.usaid.gov/pdf_docs/PA00JTJG.pdf">https://pdf.usaid.gov/pdf_docs/PA00JTJG.pdf</a>

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