STRENGTHENING COST-BENEFIT ANALYSIS IN USAID, 2011-2013:
LESSONS LEARNED AND FUTURE DIRECTIONS

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The opinions expressed are those of the authors and do not represent the views of the U.S. Government

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## ACRONYMS AND ABBREVIATIONS

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<th>Definition</th>
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<tr>
<td>AARAD</td>
<td>Acquisition and Assistance Review and Approval Document</td>
</tr>
<tr>
<td>ABADE</td>
<td>Assistance in Building Afghanistan by Developing Enterprises</td>
</tr>
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<td>ADS</td>
<td>Automated Directives System</td>
</tr>
<tr>
<td>AWDP</td>
<td>Afghanistan Workforce Development Program</td>
</tr>
<tr>
<td>B/C</td>
<td>Benefit/Cost (ratio)</td>
</tr>
<tr>
<td>BFS</td>
<td>Bureau for Food Security</td>
</tr>
<tr>
<td>CBA</td>
<td>Cost-Benefit Analysis</td>
</tr>
<tr>
<td>CEA</td>
<td>Cost-Effectiveness Analysis</td>
</tr>
<tr>
<td>COR</td>
<td>Contract Officer Representative</td>
</tr>
<tr>
<td>DLI</td>
<td>Development Leadership Initiative</td>
</tr>
<tr>
<td>E3</td>
<td>Economic Growth, Education &amp; Environment (USAID Bureau)</td>
</tr>
<tr>
<td>EP</td>
<td>Economic Policy (Office in USAID’s E3 Bureau)</td>
</tr>
<tr>
<td>ERR</td>
<td>Economic (Internal) Rate of Return</td>
</tr>
<tr>
<td>FARM</td>
<td>Food, Agribusiness and Rural Markets (USAID/South Sudan project)</td>
</tr>
<tr>
<td>FSN</td>
<td>Foreign Service National (local staff directly hired by USAID Missions)</td>
</tr>
<tr>
<td>FSO</td>
<td>Foreign Service Officer</td>
</tr>
<tr>
<td>FTF</td>
<td>Feed the Future</td>
</tr>
<tr>
<td>GCC</td>
<td>Global Climate Change</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographical Information System</td>
</tr>
<tr>
<td>ICA</td>
<td>International Cooperation Administration</td>
</tr>
<tr>
<td>IDB</td>
<td>Inter-American Development Bank</td>
</tr>
<tr>
<td>IRR</td>
<td>Internal Rate of Return</td>
</tr>
<tr>
<td>KDLC</td>
<td>Kenya Development Learning Center</td>
</tr>
<tr>
<td>KIA</td>
<td>Kenya Institute of Administration</td>
</tr>
<tr>
<td>KSG</td>
<td>Kenya School of Government</td>
</tr>
<tr>
<td>LOGFRAME</td>
<td>Logical Framework</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
</tr>
<tr>
<td>MCC</td>
<td>Millennium Challenge Corporation</td>
</tr>
<tr>
<td>MIRR</td>
<td>Modified Internal Rate of Return</td>
</tr>
<tr>
<td>MIS</td>
<td>Management Information System</td>
</tr>
<tr>
<td>NPV</td>
<td>Net Present Value</td>
</tr>
<tr>
<td>PPP</td>
<td>Purchasing Power Parity</td>
</tr>
<tr>
<td>RDMA</td>
<td>Regional Development Mission for Asia (USAID)</td>
</tr>
<tr>
<td>RER</td>
<td>Real Exchange Rate</td>
</tr>
<tr>
<td>RFP</td>
<td>Request for Proposals</td>
</tr>
<tr>
<td>RIF</td>
<td>Reduction in Force</td>
</tr>
<tr>
<td>TDY</td>
<td>Temporary Duty</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
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</tbody>
</table>
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SUMMARY AND CONCLUSIONS

After a hiatus of around 15 years, cost-benefit analysis (CBA) was reintroduced in USAID in 2011 in support of the Feed the Future Initiative (FTF), which focuses on increasing agricultural production, income and nutrition for small-farm households. Analysis of CBAs for FTF projects in 19 countries determined that their estimated weighted average economic internal rate of return (IRR) was 30%. The CBAs reviewed were not intrinsic components of most project designs, which were carried out before USAID reintroduced CBA, therefore limiting their usefulness. USAID Missions such as those in Egypt and Haiti, however, have initiated CBA of ongoing project preparation, thus contributing more to improved resource allocation. In Haiti contractual clauses require the implementing partner of Feed the Future North to carry out CBA of activities that involve infrastructure or affect more than 100 households.

An important component of the reintroduction of CBA at USAID has been a training program that has reached more than 700 USAID officers and partner-government officials. These courses have included one-week workshops, on-line training and a four-week, in-depth residential course. The shorter courses have targeted mostly non-economists and have contributed to the creation of multidisciplinary teams for carrying out CBA of agricultural projects. A December 2013 course, which was highly regarded by participants’ evaluations, demonstrated how CBA is linked to project design (logical frameworks) and to monitoring and evaluation plans.

USAID requires analysis of gender, environmental and sustainability issues as part of project design, but it does not explicitly mandate CBA. It would be difficult, however, to adhere to the requirements of sustainability analysis without carrying out some financial and economic analysis. This is true also for “value-for-money” analysis, which is now being required for large procurements. “Scaling up,” which in the case of FTF refers to the massive diffusion of agricultural technologies, would require an analysis of the financial viability of the new technologies for farmers and other economic agents, as well as their fiscal implications.

A concern is whether CBA imposes a burden in terms of time and staff resources. The burden is significantly less if CBA is carried out as part of project design, as much of the data required for CBA is also needed for evidence-based project design and performance monitoring. We are not advocating that CBA become mandatory, and in fact it would be inappropriate for some projects (e.g. policy reform). Some type of economic and financial analysis, however, is essential for meeting the sustainability-analysis requirement.

A number of Missions, most notably USAID/Haiti, have embraced CBA as a tool to improve resource allocation. Initiatives include:

- Introducing CBA early in the project cycle
- Using the results of CBA to allocate resources
- Utilizing CBA throughout the project cycle by requiring implementing partners to explicitly model the effects of proposed interventions in annual implementation plans
- Training partner-country officials in CBA
- Carrying out CBA in sectors other than agriculture, such as rural roads and power
BACKGROUND

USAID’s traditional focus on providing its assistance through projects was essentially eliminated during the course of a reengineering process in the mid-1990s, when delivery came to be centered instead on “results frameworks” for grant and contract mechanisms. Cost-benefit analysis (CBA), which had been a mandatory aspect of project preparation, was discontinued.¹ A reduction in force (RIF) of the Agency’s personnel, combined with the restructuring of the assistance-delivery mechanism, resulted in a sharp decline in the number of USAID economists, engineers, agricultural officers and other technical experts.

In 2009, USAID embarked on a process of strengthening significantly its technical and managerial capabilities. This effort included a hiring program that has doubled the number of Foreign Service Officers (FSOs), including about 50 new Foreign Service economists, and placed a renewed emphasis on project design and monitoring and evaluation (M&E). Relevant sections of the Automated Directives System (ADS) have been revised.²

In December 2011 new project-design guidance returned USAID’s focus to projects, which may include multiple mechanisms. It also mandated three types of analysis: environmental, gender and sustainability.³ The first two are required by legislation. While the “draft toolkit” for sustainability analysis does not mention CBA, it does require analysis of whether a project is beneficial from the point of view of society as a whole and whether it is financially sustainable. Both questions would be answered through CBA, which includes both economic and financial analysis.

USAID’s reintroduction of CBA was first applied to Feed the Future (FTF) projects, which are focused on agricultural development and nutritional improvements on small farms. CBA has now been extended to other sectors, as discussed later in this document. The case studies at the end of the document include examples of CBAs for both FTF projects and those for other sectors in non-FTF countries.

¹ While CBA was required for all projects, it was often carried out after projects had already been designed, thus reducing its usefulness.


WHAT IS COST-BENEFIT ANALYSIS?

Introduction. In simple language, cost-benefit analysis seeks to determine whether a project is viable by comparing its costs and benefits. Viability can refer either to financial viability (i.e. from the point of view of different economic agents participating in the project, such as farmers, bankers and other lending institutions) or economic viability (from the point of view of society as a whole, with both costs and benefits valued at their true economic worth, undistorted by subsidies, taxes or other factors). In both economic and financial analysis, costs and benefits are calculated over the lifetime of the project, with annual costs and benefits discounted at the real (i.e. inflation-adjusted) opportunity cost of capital, generally assumed to be 10-12% in developing countries. “With project” and “without project” scenarios are developed, so that what is being compared are the incremental costs and benefits resulting from the project.

One tool for comparing costs and benefits is the benefit/cost (B/C) ratio, which explains why some analysts prefer the term “benefit-cost analysis” to “cost-benefit analysis.” The B/C ratio compares the discounted present value of the expected stream of benefits minus recurrent costs over the lifetime of a project, with the discounted present value of the project’s investment costs. If the B/C ratio exceeds 1.00, the project is considered financially or economically justified, as the investment (cost) is fully recovered over time.

Another measure for ranking projects is the internal rate of return (IRR), which is the discount rate that makes the present value of a project’s cash flow (its stream of annual incremental net benefits, this time with investment outlays included in the cost stream) equal to zero. If the IRR exceeds the opportunity cost of capital, the project is considered justified financially or economically.

A third measure for evaluating a project’s viability and for ranking projects is its net present value (NPV), i.e. the present worth of the discounted incremental cash-flow stream over the years of the project’s expected lifetime (i.e. that of the largest capital asset purchased).4

Whatever measure is used—each has its strengths and limitations—the following considerations need to be borne in mind:

- The financial or economic viability of a project will be affected by the availability of complementary investments, especially in infrastructure, and it is difficult to predict if, when and where investments in new or improved infrastructure might occur over the lifetime of a project. For agricultural projects, key infrastructure includes roads, electric power and irrigation systems.
- Changes in the relative prices of both costs and benefits can be expected to occur over the lifetime of a project, and many of these cannot be predicted with a reasonable degree of reliability.

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4 USAID’s standard (default) project lifetime is 20 years, unless a case can be made for making it either longer or shorter (USAID 2012: 5).
Agricultural production in any given year is affected significantly by weather and climatic factors, including natural disasters such as floods and hurricanes. Since these risks are not the same for all projects, cookie-cutter formulae for taking them into account in benefit and cost streams are not appropriate.

International donors typically have multiple objectives in providing assistance for development projects, among which might be reducing poverty, lowering political and social tensions by focusing on neglected geographic regions, providing more economic opportunities for women, improving health through better nutrition, protecting the environment, stabilizing a conflict area and strengthening democratic institutions. Tools exist to assign economic values to some such benefits, but not all of them. Not being able to assign a value, of course, is not equivalent to saying that the value is zero, which means that qualitative judgments need to be made about the importance of such factors.

**Financial Analysis.** The basic objective of financial analysis, which is the starting point of CBA, is to determine whether a financial investment in a project can be recovered, given prevailing and expected prices of inputs, outputs and other variables. It is also useful for determining the costs of sustaining the investment once the project is completed. This is important for determining whether our major stakeholders will have a financial incentive to continue to maintain USAID’s investments. The financial analysis is carried out from the points of view of the various economic agents participating in the project, principally farmers but also others in the value chain such as lenders, traders and millers. Financial viability is necessary for ensuring sustainability and should be a main consideration of sustainability analysis.

Care must be taken to include costs and benefits for which no financial transaction occurs. For example, agricultural project costs include the value of unpaid family labor used in farm production, and benefits include the value of food produced by the project and consumed on the farm. Costs also include the value of physical capital directly used in the project, as well as that of unpaid family labor used for maintenance and repair of this physical capital. Determining appropriate values for non-monetized costs and benefits is tricky, as they will vary by project, region or country for reasons that need not concern us here.

**Economic Analysis.** The objective of economic analysis is to determine the desirability or viability of a project for society as a whole, at least from the viewpoint of appropriate allocation of scarce economic resources. (As noted above, other considerations also should be taken into account in determining whether a project is desirable.) Economic analysis requires adjustments to financial analysis to correct for a variety of price distortions, such as those introduced by subsidies, taxes, tariffs and exchange rates. Also, it can account for positive and negative externalities, such as the health benefits of treating/preventing communicable diseases or reducing air pollution, or the costs associated with underpriced natural resources such as water. The purpose of these adjustments is to express benefits and costs at their true economic values to society.
Beneficiary Analysis. FTF guidelines define beneficiaries as “those people who experience better standards of living as a result of the project through improved income and/or improved nutritional status” (USAID 2012: 8). Following standard CBA practice, persons benefiting from a project through multiplier effects are not included.

USAID’s draft FTF Economic Analysis Guidelines (USAID 2012: 8) call for beneficiaries to be divided into four categories: extremely poor (per capita consumption of <$1.25/day in PPP [purchasing power parity] dollars); poor ($1.25-$2.00); near poor ($2.00-$4.00); and non-poor (>$/4.00). These guidelines also call for beneficiary disaggregation by gender. Beneficiary analysis is particularly important for measuring progress toward achieving USAID’s goal of ending extreme poverty worldwide by 2030.

Related Analyses. USAID’s draft FTF Economic Analysis Guidelines call for environmental, social, and institutional analyses, “as needed” (USAID 2012: 1). Environmental costs and/or benefits are often significant in agricultural projects, but they can be difficult and costly to measure.5 Where poverty reduction is a major objective, as with FTF projects, social analysis is important. The income- and gender-disaggregating beneficiary analysis described above is one form of social analysis; but at times a more comprehensive analysis, including an examination of social interaction among various project participants, would be desirable to help discern ways of overcoming barriers to social mobility. Institutional analysis is important for determining whether the various public and private institutions involved in a project are likely to have the managerial and administrative capacities necessary for it to be financially and economically viable and sustainable over its expected lifetime—i.e. well beyond the time USAID’s involvement has ended. If doubts arise about these capacities, institutional analysis can suggest complementary actions needed to provide a reasonable expectation that managerial and administrative capacities can be strengthened to the extent necessary. The cost of undertaking these actions can then be incorporated into the CBA for the project.

Links to Project Design. Ideally, a CBA should be conducted during the design stage—before a project is given final approval, in order to optimize the dimensions of the project in terms of NPV, affordability and sustainability—or at least before implementation has begun. A good CBA will point out conceptual weaknesses, quantify risks, identify bottlenecks that need to be overcome, suggest alternative project designs, and point to complementary investments and policy and administrative reforms that might be needed to ensure project sustainability. CBA analysts will need to work closely with agronomists, engineers and other technical specialists. For agricultural CBAs, they should also meet with farmers and others in the field, in order to gain a comprehensive vision of the project’s components, the roles of the various groups

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5 Belli et al. (2001: Ch. 6) provide guidance on measuring environmental externalities.
involved (farmers, input suppliers, traders, processors and others), and the ways in which
government policies and other actions affect a project’s viability and sustainability.

**Links to Monitoring and Evaluation.** One of the key goals of USAID Forward, the Agency’s
large-scale reform agenda, is to strengthen its monitoring and evaluation (M&E) capabilities. A
good M&E system should be able to track implementation variables, including inputs, outputs
and impacts, and compare them to a project’s stated targets. Cost-benefit analysis can be useful
in this context for recalibrating targets and for conducting mid-term and final project evaluations.
Accordingly, CBAs should be designed so that the data they provide properly support M&E
activities, which might include an *ex post* CBA.

At present, a major inconsistency is evident between CBA and the FTF Monitoring and
Evaluation System. While CBA analyzes *ex ante* the likely effects of projects on direct
beneficiaries, and provides a framework for *ex post* measurement of actual results, key FTF
indicators of welfare such as per capita consumption are based on total population in zones of
influence. This inconsistency might be difficult to resolve.

**Links to Scaling Up Agricultural Technologies.** USAID is beginning to implement a series of
activities designed to scale up agricultural technologies—i.e. diffuse them on a large scale. In
order to determine if a particular technology will scale up, it is necessary to know whether the
various economic agents in the value chain have incentives to adopt it. Financial analysis and
risk analysis are essential for making this determination. Additionally, the fiscal implications of
scaling up need to be quantified. Financial analysis from the points of view of key economic
agents and quantification of fiscal implications are intrinsic components of CBA.
Initial Applications: Feed the Future. The reintroduction of CBA in USAID began with an evaluation of the financial and economic viability of projects under the Feed the Future Initiative (FTF), the U.S. Government’s whole-of-government contribution to the international approach to agricultural development and global food security agreed to and endorsed by the international community in several fora during the second half of 2009. The FTF Initiative—in which USAID plays a key role—originally focused on 20 countries, but this number was reduced to 19 when Nicaragua did not develop an effective Country Implementation Plan.

Methodology for Evaluating Projects in the First Six FTF Countries. At the onset of the FTF Initiative, USAID senior economists estimated its potential effects on the per capita income of potential direct beneficiaries. This exercise involved a two-step process. First, expected costs per beneficiary were estimated on the basis of the experience of other donors, principally the Millennium Challenge Corporation (MCC) and the World Bank. Second, the expected changes in per capita income of direct beneficiaries were estimated by assuming that the internal rate (IRR) of return of FTF programs would be at least 12%.

To validate these two parameters, i.e. the average cost per beneficiary and the weighted average IRR, USAID decided to undertake CBAs of FTF programs. In early May 2011, the management of USAID’s Bureau for Food Security (BFS) requested support from the E3 Bureau to carry out CBAs in five countries by September 2011. In late May Haiti was added to the initial list.

To carry out these analyses, USAID invested heavily in CBA training (see below), and established a CBA Working Group that consulted standard CBA references and resolved discrepancies among them. Decisions were codified in the Working Group’s minutes and eventually in USAID’s draft FTF Economic Analysis Guidelines (2012). The Working Group adopted a uniform discount rate of 12%.

Expanding CBA to the Remaining FTF Countries. Teams of E3/EP economists and BFS agricultural officers supported by USAID Mission staff carried out CBAs in the first six countries; all teams included newly-hired Development Leadership Initiative (DLI) officers. For the next 13 countries this modus operandi had to be modified, as E3/EP would have been unable to staff sufficient teams to carry out CBAs in so many countries. To meet this increased demand, workshops were organized at regional Missions in Asia, South Africa, East Africa, West Africa and Guatemala, where participants from neighboring countries brought data on FTF projects for their particular countries. After two days of training, teams supported by E3/EP staff initiated the CBA analysis. Most CBAs for those 13 counties were carried out primarily by staff from the respective Missions, with support from E3/EP economists, who also provided quality control of

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6 See Belli et al. (2001), Gittinger (1982), Harberger and Jenkins (2002), and Jenkins, Kuo and Harberger (2011).
the CBAs. This activity consisted of three steps: an internal review by E3/EP staff, a second review by an external consultant with vast experience in carrying out CBA, and a final review by E3/EP.

**Findings.** USAID’s reintroduction of CBA was a major effort undertaken at a time when the Agency’s technical expertise in this area had been severely depleted. Accordingly, USAID needed significant new staffing—both direct-hire and a few contractors—as well as specialized training in CBA, within a short time span, to meet both the scope and quality of analytical objectives. Additional challenges were posed by the increasing complexity of CBA over the last several decades, and by conflicting or unclear guidance from the standard references on how to deal with some issues, especially for projects with unusual if not unique characteristics. An issue with many of the CBAs is that they were carried out when projects were already under implementation or had already been designed. As a consequence, the CBA did not contribute to improved project design or to the development of M&E indicators.

As of December 2013, CBA analysis of 28 projects in 14 countries had been completed and reviewed. The estimated weighted modified economic internal rate of return (MIRR) was 30% and the median was 22%. The main results are summarized in Table 1.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Value</th>
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<tbody>
<tr>
<td>Number of Countries</td>
<td>14</td>
</tr>
<tr>
<td>Number of Projects Evaluated</td>
<td>28</td>
</tr>
<tr>
<td>Net Present Value of Projects (12% interest) ($ million)</td>
<td>9,500</td>
</tr>
<tr>
<td>Weighted Modified Economic Internal Rate of Return (MIRR) (%)</td>
<td>30</td>
</tr>
<tr>
<td>Range of MIRRs (Economic) (%)</td>
<td>9-187</td>
</tr>
<tr>
<td>Median MIRR (Economic) (%)</td>
<td>22</td>
</tr>
</tbody>
</table>

**USAID Investment in CBA Training.** An important component of the reintroduction of CBA at USAID has been a wide-ranging training program that is summarized in Table 2. More than 700 USAID and partner-country officers were trained in 27 courses.

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7 CBAs for projects in five additional Feed the Future countries have been completed and are being reviewed.
Table 2: CBA Training Program, 2010-2013

<table>
<thead>
<tr>
<th>Course Description</th>
<th>No. of Courses</th>
<th>No. of Participants</th>
</tr>
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<tbody>
<tr>
<td>General CBA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Four-week Residential</td>
<td>4</td>
<td>90</td>
</tr>
<tr>
<td>On-line Course</td>
<td>2</td>
<td>155</td>
</tr>
<tr>
<td>Feed the Future Workshops</td>
<td>10</td>
<td>200</td>
</tr>
<tr>
<td>Project Design &amp; CBA</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>GCC Mitigation</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>GCC Adaptation</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>RDMA: Energy, GCC, Agriculture</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>Pakistan: CBA Focused on Managers</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>Afghanistan: CBA for Power &amp; Agriculture</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>CBA for Agricultural Project Design</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>Advanced Topics in CBA: Power, Education &amp; Health</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>South Africa: CBA for Government Counterparts</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>Kenya: CBA Course for Government Counterparts</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>27</strong></td>
<td><strong>730</strong></td>
</tr>
</tbody>
</table>

The training began in 2010 when 25 USAID officers participated in a four-week course at Duke University. That course was repeated at Duke in 2011 and then was offered at Queens University in Ontario, Canada in 2012 and 2013. Approximately ninety individuals were trained in these courses, including five government officials from Haiti, one from Nicaragua and one from Kenya. In partnership with the World Bank, USAID funded two on-line courses that were taken by 155 individuals, of whom about 40 were partner-country officials.

As noted in Table 2 above, 10 one-week workshops were offered in support of Feed the Future Programs at USAID/Washington and at regional and bilateral Missions. They targeted non-economists and generally consisted of 2.5 days of training and 2.5 days of carrying out CBAs with actual data brought by the participants. These workshops were essential for the completion of CBAs in about 15 separate countries.

Three courses linking project design, M&E and CBA have been offered, providing training to more than 50 USAID officers. The December 2013 course, CBA for Agricultural Project Design, was based on a case study of an actual Feed the Future project in Haiti (Feed the Future North). This course had the following components:

- Two days developing a Results Framework and a Logical Framework (LOGFRAME)
- Two days using CBA
- One day showing the links between CBA, LOGFRAME and M&E
Given the importance of doing CBA in sectors besides agriculture, a number of courses covering other sectors have been offered. Two courses in Washington DC focused on the economics of Global Climate Change (GCC) mitigation and adaptation. Courses devoted to other sectors were also offered by the Regional Development Mission for Asia (RDMA) in Thailand, Pakistan and Afghanistan. The Afghanistan course, in which five government officials participated, included one week of training and one week carrying out CBA of Mission projects in the agricultural and power sectors. A course in Washington in December 2013 on Advanced Topics in CBA covered general topics such as the calculation of foreign exchange premia as well as in-depth discussion of CBA in three sectors: power, education and health.

Training government officials has become a key component of the CBA initiative. Government counterparts have been included in courses for USAID officers, and two four-week courses exclusively for about 80 partner-country officials from Kenya and South Africa have been offered. Additionally, courses for training government officials from Haiti and East Africa (Ethiopia, Kenya and Tanzania) have been designed. The Haiti series of courses is expected to last for two years, train 80 officials and support eight CBAs, including those for Public-Private Partnerships (PPPs) for infrastructure. The East Africa course is linked to President Obama’s Power Africa Initiative, announced on June 30, 2013, and will train officials on regulation, project finance and CBA.
COSTS AND BENEFITS OF COST-BENEFIT ANALYSIS (CBA): THE CASE OF FEED THE FUTURE

Introduction. Is it worth spending resources to carry out cost-benefit analysis? The answer depends on when it is carried out in the project cycle and whether it is an intrinsic component of project design; on the skills of the team carrying out the analysis; and on the receptivity of the managers leading the project-design effort.

CBA for agricultural-production projects comprises four main steps:

1. Gathering basic farmer-level data, which is the most difficult and time-consuming part of agricultural-production CBAs;
2. Developing farm budgets;
3. Aggregating flows from the farm level to the overall project level, adding revenues or deducting costs incurred “outside the farm,” and developing Monitoring and Evaluation (M&E) indicators; and
4. Adjusting financial prices to reflect opportunity costs, carrying out sensitivity analysis, and computing NPVs, IRRs and B/C ratios.

Steps one through three should already be carried out as part of project design, while step four is only relevant if CBA is being carried out. The Office of Economic Policy in USAID’s Economic Growth, Education & Environment Bureau (E3/EP) is developing an Excel template that could facilitate the mechanical aspects of all steps. In most cases, undertaking CBA will be worth the effort if it is carried out as an intrinsic part of project design, as is the practice at the World Bank and Inter-American Development Bank (IDB). Even a limited CBA (“CBA lite”) can contribute to the design of better projects and improved resource allocation.

The following paragraphs discuss these issues in more detail.

CBA and the Project Cycle. CBA for agricultural-production projects begins with a definition of the main potential beneficiaries, who in the case of FTF are almost always small farmers. The first step is to identify one or more “representative farms” that can be used to characterize all the farms in the universe of potential beneficiaries. Farm budgets are prepared for each of the representative farms. This is the most time-consuming aspect of CBA. Information gathered and/or calculated includes current and expected values (with and without USAID support) of:

- Area (hectares) devoted to agricultural production by crop/type of livestock
- Yields per hectare
- Quantity of sales
- Value of sales
- Prices per unit of production sold
- Quantity of on-farm consumption
• Variable costs (values, prices and quantities) for inputs, including seed, fertilizer and hired labor
• Gross margin, which is calculated from the information above by subtracting variable costs (excluding the value of family labor) from the total value of production
• Fixed costs such as rent, depreciation and interest
• Net farm income, which is equal to gross margin minus fixed costs
• Value of family labor
• Management and investment income, which is equal to net farm income minus the value of family labor

After the data are gathered for one or more representative farms, the analysts estimate the effects of potential USAID interventions on these variables. This step includes projecting, for each representative-farm group, the number of targeted farmers who adopt the interventions each year during the project period and the amounts by which yields increase from year to year. Agronomists and other agricultural specialists play a crucial role in this multidisciplinary effort. Regardless of whether CBA is carried out in full, gathering this type of information is necessary to design evidence-based projects and to establish realistic M&E indicators, including targets.

After the total financial flows from the farm interventions are estimated, it is necessary to add those expenditures that are incurred by USAID outside the individual farms, such as the cost of management, training programs and technical assistance. Additionally, it is often necessary to adjust the financial flows to eliminate transfer payments such as taxes and subsidies, and to use shadow prices to reflect opportunity costs (notably for family labor). Afterwards, NPVs, IRRs and B/C ratios are calculated and sensitivity analysis is carried out.

**Skills of Project-Design Teams.** Agricultural project design and related CBA should be a multidisciplinary effort that includes agronomists, irrigation specialists, economists, private-sector officers and others. As noted above, E3/EP has conducted a number of courses on the fundamentals of CBA, in which more than 700 USAID and partner-government officials have participated. A large proportion of these courses specifically targeted agricultural officers. Participant evaluations of the “CBA for Agricultural Project Design” course conducted in December 2013 led USAID’s Bureau for Food Security (BFS) to request that the course be repeated in 2014.

**Costs of CBA.** Many of the CBAs of Feed the Future Programs carried out to date were conducted after the projects had been designed and were already in implementation. The average level of effort for the initial CBAs of six countries has been estimated at approximately 26 person-weeks, or about two calendar months for a three-person team. However, more than one CBA was conducted in each of these countries. A single CBA would have taken between 6 and 10 weeks, depending on the complexity of the project and the data that had been collected. This level of effort can be broken into the following components for a Washington-led CBA:
Table 3: Average Level of Effort per CBA

<table>
<thead>
<tr>
<th>Activity</th>
<th>USAID/W</th>
<th>Mission</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>First TDY</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Analysis</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Review</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>5</td>
<td>3</td>
<td>8</td>
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</tbody>
</table>

If CBA is carried out as an integral part of project design, as at many institutions including the World Bank and Inter-American Development Bank (IDB), the incremental level of effort would be even less.

**Influencing Project Design and Resource Allocation.** CBA has benefits only if it improves project design and has an impact on resource allocation. While this can be accomplished in general by introducing CBA early in the project cycle, the example of Haiti demonstrates its value even after a project has already been designed.

CBA analysis started in USAID/Haiti after Feed the Future West was under implementation and Feed the Future North had been designed and was under procurement. Given that Feed the Future North follows the usual USAID value-chain project design and is essentially a “rolling design,” with the actual activities being defined in annual implementation plans, the Mission requested that the implementing partner carry out CBA of planned activities above thresholds described in the Haiti case study in the Annex to this document.

While CBA was not an intrinsic part of the project design, USAID/Haiti required it as a part of the annual implementation plans in order to inform and promote better resource allocation.

USAID/Georgia has followed a similar approach for an agricultural project. The contract with the implementing partners states that "monitoring must include the development and maintenance of regular cost-benefit analyses to track the progress of the activity in meeting its expected results, including tracking success of grantees."
FUTURE DIRECTIONS OF CBA AT USAID

USAID Mission Support for Expanding CBA. A number of USAID Missions are supporting CBA beyond the FTF mandate. Among the main consequences of this support are that:

- CBA is being carried out early in the project cycle, thus increasing its potential impact
- The results of CBA are having an effect on resource allocation
- CBA is being used throughout the project cycle
- Partner-country officials are being trained in CBA and countries are being encouraged to undertake CBA of their own programs
- CBA is expanding to other sectors such as power and roads

Table 4 provides a summary of these efforts in six countries.

<table>
<thead>
<tr>
<th></th>
<th>Afghanistan</th>
<th>Egypt</th>
<th>Haiti</th>
<th>Kenya</th>
<th>S. Africa</th>
<th>S. Sudan</th>
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<tr>
<td>Early in project cycle</td>
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<td>Impact on resource allocation</td>
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<tr>
<td>Throughout project cycle</td>
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<tr>
<td>CBA for partner-country projects</td>
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<td>Other sectors</td>
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</table>

Carrying out CBA Early in the Project Cycle. In Haiti the Mission developed a strategy for rural roads and a multi-criteria procedure for selecting roads that would be subjected to further economic analysis. Economic analysis has now been carried out on 38 proposed road segments, and only those with a positive NPV will be funded. In Egypt the Mission selected value chains for possible inclusion in a project by carrying out, for a large number of possible crop interventions, preliminary multiple-criteria analysis weighing various characteristics of importance. It also took into account other criteria, such as financial returns to farmers, market potential, employment generation, water use, direct and indirect nutritional benefits, female participation and innovative farm/processing solutions.

Impact on Resource Allocation. In both Egypt and Haiti, where CBA was introduced very early in the project cycle, the analysis contributed to improved decisions. In South Sudan, CBA was carried out after a project was under implementation but still contributed to improved resource allocation. The implementing partner had been considering two options, one with high yields and high costs and one with lower yields and lower costs. The CBA analysis concluded that the second option was better from the financial point of view, and that was the one implemented.
**Using CBA throughout the Project Cycle.** In South Sudan, CBA was conducted at the midpoint of the project, and contributed to improved resource allocation. That was possible because many USAID projects supporting value chains are “rolling designs” that allow for midcourse corrections. In Haiti, CBA was carried out after one FTF project was being implemented and another had been designed and USAID had issued a request for proposals (RFP). In the latter case, the Mission required that the implementing partner carry out CBA of any activity involving infrastructure or that would affect 100 or more farm households.

**Encouraging the Use of CBA by Partner Governments.** Encouraging partner governments to use CBA in their own decision-making can contribute to improved resource allocation and support elements of USAID Forward. The USAID Missions in Kenya and South Africa sponsored four-week CBA courses for government officials; the Afghanistan Mission included five counterparts in a course that targeted mainly USAID officers; and the Haiti Mission sponsored the attendance of five government officials at a four-week course and designed a two-year program to train 80 more officials.

**Expanding CBA to Other Sectors.** The Afghanistan Mission has carried out CBA of rural roads, agriculture, mobile money, energy and workforce development projects, and will soon carry out CBA of a potable water project. USAID/Haiti has carried out CBA of a rural roads project and will soon support CBA of power and other infrastructure projects.

With respect to road projects, CBA is important for determining whether USAID can certify that the infrastructure projects it seeks to support are sustainable, as required by Section 611(e) of the Foreign Assistance Act. Quantifying the safety benefits of road construction and improvements could help strengthen the commitment of developing-country Governments to providing credible plans for road maintenance following the termination of USAID support.
SHOULD CBA BE MANDATORY IN USAID?

In the 1990s the practice of CBA disappeared in USAID, and its use by other donors such as the World Bank and Inter-American Development (IDB) declined significantly. CBA is now experiencing a resurgence in USAID, while the World Bank has reissued its guidelines for project analysis and the IDB has begun to provide training in CBA for its staff.

As noted in the Background section of this document, USAID’s ADS on project design mandates three types of analysis: environmental, gender and sustainability. The first two are statutory, while the third one is USAID policy. CBA is recommended but not required.

Sustainability analysis seems to imply that CBA should be carried out. The toolkit requires that sustainability analysis provide an answer to the question, “what are the contributions of the project to the economic welfare of the host country?” Showing how a project contributes to the welfare of a country is precisely the essence of CBA.

USAID’s Acquisition and Assistance Review and Approval Document (AARAD) must be used to review planned acquisition and assistance awards at or above an estimated total cost of $25 million. The AARAD requires that “value for money” be demonstrated. While value for money is a concept broader than CBA as usually carried out, CBA would be a necessary component of value-for-money analysis. CBA can also contribute to the scaling-up initiative by determining if the various economic agents in the value chain will have incentives to adopt new technologies. In addition, CBA can help quantify the fiscal implications of scaling up.

This paper does not advocate that CBA become mandatory at this time. As discussed in the Annex, a number of Missions have decided to introduce CBA as part of the project design and implementation process, and about 80 USAID officers have received in-depth training in CBA. However, rather than imposing CBA as an additional USAID/Washington requirement, it might be more advisable at this time to allow Missions to adopt CBA if they consider it a useful tool for improving resource allocation, and for carrying out sustainability analysis and value-for-money analysis. If USAID management were to decide to mandate CBA, it should also define those activities for which CBA is inappropriate. In these latter cases, cost-effectiveness analysis (CEA)—which basically seeks to determine the lowest unit-cost alternative for achieving a desired outcome—or some other type of economic and financial analysis should be required.
ANNEX: CASE STUDIES

The case studies in this Annex illustrate how CBA has been used by various USAID Missions for projects in agriculture as well as in other sectors. In all of these cases, the proactive support of CBA by Mission staff has been key to its effective use.

HAITI

Background. Among all Missions, USAID/Haiti has been the most active supporter of CBA. This support started in 2010 and 2011, when the Mission sent four Foreign Service Nationals (FSNs) to the four-week CBA courses. In 2012 the Mission sponsored a one-week CBA course that covered agriculture, rural roads and health. About 20 officers attended.

Using CBA Early in the Project Cycle. The best example of early-use CBA in Haiti is the development of a rural roads strategy to guide a $65 million program. The strategy included the following objectives:

- Maximize NPV to society
- Maximize the number of road beneficiaries with secure tenure
- Have the highest support of adjacent communities in order to enhance the probability of adequate maintenance
- Have the least negative impact on the environment
- Open marketing opportunities to areas with the greatest potential for agricultural production
- Connect areas with health and education facilities
- Maximize reduction in post-harvest losses
- Provide opportunities for the greatest participation by women in road-maintenance and agricultural-enhancement activities
- Maximize labor-intensive techniques

Using aerial mapping and Geographic Information System (GIS) technology, various characteristics of rural zones were superimposed to map the population, agricultural-development, extension and engineering characteristics within the area of influence of each possible priority road. The engineering characteristics included accessibility in terms of road-surface roughness, topography, rainfall, geotechnical properties, geometry, slope stability and drainage. This engineering information enabled analysts to determine the minimum life-cycle costs of construction, maintenance and vehicle-operation for the 20-year life expectancy of the road. Roads that (a) served more motorized and non-motorized users (pedestrians and animal carts); (b) served more farm-to-market agricultural produce; and (c) were in worse conditions, or had higher surface-roughness values, would usually have higher selection priority, and would produce higher NPV.
The use of GIS, aerial mapping and necessary engineering expertise—available in most USAID priority countries—makes it possible to accelerate the design and construction/improvement activities of the selected priority rural roads by determining the volume of the earth, drainage, pavement, slope-stability and road-safety improvements needed to minimize the life-cycle costs of any given traffic projection.

**Impact on Resource Allocation.** The strategy and CBA of specific road segments are helping to determine where the roads will be built, thus maximizing the returns for this $65 million investment. While the Mission at times has come under some pressure to accelerate the construction of roads by reducing the time required for analysis, CBA provided vital information that enabled the Mission to choose whether to rehabilitate a road, based on its IRR.

**Using CBA throughout the Project Cycle.** CBA analysis started in USAID/Haiti after Feed the Future West was under implementation and Feed the Future North had been designed and was under procurement. Given that Feed the Future North follows the usual USAID value-chain project design, the Mission is asking the implementing partner to carry out CBA of planned activities above a threshold. Specifically, the contact specifies:

- “Economic Analysis for Roads and Other Large Public Works: The Contractor shall submit economic analysis for any road construction or rehabilitation for approval by the Contract Officer Representative (COR) before any such activities are undertaken. Economic analysis will include a traffic count study (for roads), unit price analysis, cost-benefit analysis, and beneficiary analysis.

- “Economic and Financial Analysis for Farm-Level Investments: The Contractor shall submit economic and financial analysis for large-scale (more than 100 households) farm-level investments before any such activities are undertaken. This will include a cash flow analysis, cash flow analysis adjusted to include economic costs and benefits, and a beneficiary analysis.”

**Use of CBA by Partner Country.** In 2013, USAID/Haiti funded the participation of five Haitian Government officials at the four-week CBA course at Queen’s University in Canada. The Mission has now designed a two-year project that is expected to train 80 officials in CBA, regulation of monopolies and project finance. It will also support the analysis of eight projects.

**Expanding CBA to Other Sectors.** Up to now USAID/Haiti has carried out CBA of agricultural value chains and rural roads projects. In the future it plans to work on power, highways, ports and airports.
Background. Modernizing and expanding the agricultural sector is key to improving living standards in South Sudan, the world’s newest nation and one of its poorest. Most households still engage in agricultural pursuits, typically as subsistence farmers producing crops such as corn, sorghum, cassava and groundnuts. Decades of civil war forced many people from their land, depleting the country’s agricultural knowledge base. Despite significant arable land, plentiful water and good-quality soil, yields are low and most of South Sudan’s food is imported. Even farmers in the most fertile region—the “Greenbelt” that crosses the three Equatorial states—are affected adversely by poor-quality seeds, deficient equipment, lack of farm-to-market roads and post-harvest losses resulting from inadequate or nonexistent storage.

Use of CBA to Analyze Alternative Approaches to Improving Crop Yields. To examine the effects of USAID’s assistance in South Sudan’s agricultural sector since 2012, a USAID team conducted a cost-benefit analysis of the $26 million in USAID funds being spent annually to support the Feed the Future Initiative. The analysis examined two different techniques for improving crop yields, both of them promoted under USAID’s Food, Agribusiness and Rural Markets (FARM) project. Begun in 2010, FARM seeks to boost agricultural growth through improved inputs, stronger market linkages, more favorable conditions for private-sector investment and better infrastructure to facilitate trade.

One technique promoted by FARM required relatively expensive inputs but promised potentially dramatic yield increases. A second technique focused on more simple improvements such as improved seeds and proper weeding and seed-row spacing, which would result in more modest yield increases. The team observed actual outcomes produced by the two techniques and considered the sustainability of each.

Results and Impact on Resource Allocation. The USAID team found that the cheaper technique of improving farm yields resulted in greater profitability for South Sudanese farmers and was much more likely to be sustainable once the project ends. This finding led USAID to shift the focus of the project toward the cheaper and more sustainable intervention. With a modest investment of resources to conduct the CBA, USAID increased the development impact of taxpayer dollars significantly. Farmers in South Sudan stand to benefit economically from the findings of this analysis and are less likely to need emergency food assistance in the future.
Background. USAID/Afghanistan was one of the first Missions to broadly apply cost-benefit analysis to a large number of its programs (starting in 2011), and it remains strongly committed to this analytical tool. A number of analysts have conducted CBA, including one who worked full-time for four months in 2012. The following year, the Mission sponsored a two-week CBA course that covered USAID/Afghanistan projects in agriculture and energy. Strong demand for this course resulted in the scheduling of another for February 2014, and discussions with Mission personnel suggest an interest in expanding the training activities to large courses for government personnel as part of an effort to improve financial management in the public sector.

Using CBA Early in the Project Cycle. USAID/Afghanistan has used CBA early in the project cycle and even in the decision phase for a number of projects, including an assessment of the feasible impact of mobile money, possible construction options for renovation/rebuilding of the Salang Tunnel, assisting small and medium-size enterprise development under the Assistance in Building Afghanistan by Developing Enterprises (ABADE) program, and assessing the viability of a vocational education activity with the Afghanistan Workforce Development Program (AWDP).

Impact on Resource Allocation. It is too soon to determine the full impact of CBA on resource allocation in Afghanistan, but CBA did help narrow the tunnel-construction options for Salang. No decision based on that information has yet been made.

Expanding CBA to Other Sectors. Up to now USAID/Afghanistan has carried out CBA for agricultural value chains, rural roads, energy projects, workforce development and other economic growth projects. The training scheduled for February 2014 will expand CBA into water projects for the first time.
USAID Institutional Support for Training. The International Cooperation Administration (ICA), the predecessor to USAID, provided funding in 1961 for the creation of the Kenya Institute of Administration (KIA) to help the country prepare its civil service after independence. In 2012 the Kenyan Parliament passed the Kenya School of Government (KSG) Act, establishing the successor to the KIA and creating the Kenya Development Learning Center (KDLC) with four satellite campuses.

USAID and the KSG have forged a strong relationship whose objectives are to strengthen the capacity of Kenyan public officials for improved governance and to ensure an effective public sector that delivers high-quality public services. The Vision 2030 Secretariat, in charge of long-term strategy development in Kenya, as well as the Task Force on Devolution, has identified the KSG as critical to continuous capacity building in national and county governments. The KSG has not only responded to Kenyan government needs but also to the capacity-building needs of other countries in the region. USAID has been proactively supporting the KSG in assisting the county governments created in 2013.

Training in CBA. In May 2013, USAID partnered with the KSG to provide training in cost-benefit analysis to Kenyan and Tanzanian government officials. The training provided courses in finance, economics, risk analysis and advanced use of Excel-based applications. Targeted government officials learned both theory and its practical application to development projects. Course instructors reported that the performance of participants was one of the highest in all courses offered thus far for government officials. As part of the course work, each participant applied the knowledge and skills imparted to prepare an integrated appraisal of a major investment project. The course was evaluated through quizzes, solutions to preparatory case studies and completion of a feasibility study. Thirty-six Kenyan government officials and five from the Tanzanian government benefited from this high-profile course, which was oversubscribed.

Expanding CBA to Other Sectors. Interest in such capacity-building exercises continues, with full support from the Economic Planning Secretariat and the Ministry of Devolution and Planning, which would like to see this activity become a government-wide program for technical staff.
SOUTH AFRICA

Training in CBA. USAID began to train South African Government officials in the use of CBA in 2011. The objectives of this training were to improve the efficiency and poverty-reduction orientation of expenditures on development activities and to make them more sustainable. The initial CBA course strengthened relationships between the two governments and led to a significant expansion of the training, which focused on establishing government-wide policy-assessment standards and guidelines.

Use of CBA by Partner Country. In a cooperative effort with South Africa’s Ministry of Finance, 35 South African Government officials participated in an in-depth, four-week CBA course. Upon its completion, the participants requested an executive course for higher-level officials that would permit them to use CBA concepts to improve the management of their respective agencies. This training was particularly timely in view of the Government’s ambitious plans for spending on development projects over the next five years. Exposure to CBA techniques strengthened the South African Government’s capacity to prioritize projects for analysis and to improve the efficiency of its development expenditures.
EGYPT

Resource-Allocation Model incorporating CBA. Optimal resource allocation is key to ensuring effective use of limited aid resources, especially in an environment of tight fiscal constraints. A resource-allocation model, incorporating CBA, was developed in Egypt to achieve this objective.

To begin with, USAID/Egypt clearly defined its objective function. This procedure consisted of two steps: identifying outcome dimensions of significant interest and ranking them in order of importance to the Mission. The following outcome dimensions were identified: (1) market potential, (2) profitability, (3) employment generation, (4) water use, (5) direct and indirect nutritional benefits, (6) female participation and (7) innovative farm/processing solutions.

Ranking Potential Activities. Given data limitations and for ease of implementation, the model developed in Egypt broke the resource-allocation decision into a two-step process. The first, which has been completed, was to rank the universe of potential agricultural value-chain candidates in order to select a manageable number—in this case, fifteen. Using a weighting scheme reflecting the Mission’s preferences, the outcome dimensions were aggregated into a single index that ranked the 15 value chains and narrowed them to five: eggplant, winter tomato, garlic, winter zucchini and basil. In other words, the Mission established a minimum standard that potential value chains had to meet in order to qualify for consideration.

Using CBA to Select Activities to Be Funded. The second step is to derive an investment-demand function facing the Mission, based on possible interventions for the five value chains. While CBA models have been completed for several value chains, not all of the alternative interventions for the respective value chains have yet been determined, so that the analysis about to be presented is illustrative rather than actual.

Using CBA, the Mission will eventually give each intervention a score based on its economic viability (i.e., internal rate of return) and budget requirement. The illustrative interventions are plotted in Figure 1 according to their assumed economic viability score, from highest to lowest (measured on the vertical axis), and their cumulative budget requirements (horizontal axis). A feasible optimal region of the investment demand function is then mapped, first by identifying a minimum economic viability requirement (an IRR of 12%, the cost of capital) as a horizontal constraint (dotted line). All projects whose internal rate of return is greater than the cost of capital are economically viable; those below are not. Then a budget constraint (in this case $65 million) is added as a vertical dotted line. To the left of this line lie all projects the Mission can afford. If the intersection of the two constraints happens to occur above and to the right of the investment demand function, then the minimum economic viability requirement is the binding constraint. In other words, not all projects that could be financed would have the necessary economic viability to exhaust the Mission’s budget. On the other hand, if the intersection of the two constraints is below and to the left of the investment demand function—as in this illustrative case—then the available budget is the binding constraint. In other words, USAID/Egypt’s budget would not be large enough to fund all economically viable projects. Therefore the Mission’s $65 million budget would be allocated to fund interventions only for the eggplant, winter tomato and garlic value chains. Winter zucchini is assumed to have an economic return above the cost of capital, but funding would not be available; basil would not be considered because its assumed IRR is lower than the cost of capital.
Figure 1: Egypt Resource Allocation Model
REFERENCES


