



Evidence on the unit costing of outputs in international development

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Question

What is the available evidence on the use of unit costs across the international development sector? Specifically, where and how are they used to drive good value for money and decision-making? Focus on unit costing of outputs rather than inputs.

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The K4D helpdesk service provides brief summaries of current research, evidence, and lessons learned. Helpdesk reports are not rigorous or systematic reviews; they are intended to provide an introduction to the most important evidence related to a research question. They draw on a rapid desk-based review of published literature and consultation with subject specialists.

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1. Overview

This report lists evidence identified and pulls out key information (as agreed with the requester) relating to the use of cost per unit of output across the international development sector. Information is extracted on costed outcomes, use of the unit cost, sector, context, and tools/datasets. Research was identified from the education, health, infrastructure and agriculture sectors.

Research identified in the education sector has used unit cost per child, and cost per standardised test score.

Two examples were found on health while undertaking this rapid review. With more resources, I recommend exploring the health area more fully as there is a sense that there is more here on unit costing outcomes. More time is required for careful examination of documents to discern from the wealth of examples on unit costing inputs when it is the costing of outputs that we are interested in.

Examples were also found for road construction, solid waste management, solar energy and agriculture. Some of these examples are costing with net present value which could be considered closely related to costing output and worth exploring for this topic.

Costing exercises are generally used to inform decision-making and in some cases to investigate decisions that have already been made.

2. Examples of unit costing by output in development

Education

Public Expenditure Review of the Education Sector in the Democratic Republic of Congo An Efficiency, Effectiveness, and Equity Analysis

Feda, K., Savrimootoo, T., Miningou, E.W., & Kalindula, S. (2015) The World Bank Group
<https://openknowledge.worldbank.org/bitstream/handle/10986/22932/ACS14542revd.pdf?sequence=6&isAllowed=y>

Costed outcome: cost per child in school

Use of the unit cost: prioritising options for addressing large number of out of school children

Sector: Education

Context: World Bank research in the DRC

Tools/data sets: (i) 2005 and 2012 1-2-3 Household Budget Survey, (ii) 2014 Demographic and Health Survey, (iii) Education Management Information System from 2009 to 2013, (iv) payroll data from SECOPE (Service de Contrôle de la Paie des Enseignants), (v), budget data from the Ministry of Budget, (vi), learning 2 outcomes at primary and secondary levels from MEPSP (Ministère de l'Enseignement Primaire, Secondaire et Professionnel), and (vii) donor data from CAT (Cellule d'Appui Technique) and PGAI (Plateforme de Gestion de l'Aide Internationale) and (viii) other data collected from field visits and development partners

School access, resources, and learning outcomes: Evidence from a non-formal school program in Bangladesh

Dang, H. A., Sarr, L. R., & Asadullah, M. N. (2011).

<https://openknowledge.worldbank.org/bitstream/handle/10986/27319/810600WP0P10620Box0379826B00PUBLIC0.pdf?sequence=1&isAllowed=y>

Costed outcome: cost per child in school

Use of the unit cost: investigating whether the Reaching Out of School Children project is effective in raising enrolment and learning outcomes

Sector: Education

Context: Average government expenditure per student taken from academic papers

Tools/datasets: Panel data from household and school surveys and censuses in Bangladesh

Estimation of drivers of public education expenditure: Baumol's effect revisited.

Nose, M. (2017). *International Tax and Public Finance*, 24(3), 512-535.

<https://www.imf.org/external/pubs/ft/wp/2015/wp15178.pdf>

Costed outcome: per-pupil public education expenditure

Use of the unit cost: examining driving factors of higher unit cost of public education

Sector: Education

Context: IMF Working Paper, academic

Tools/data sets: data from UNESCO Institute for Statistics, ILO, OECD, and World Development Indicators

Cost-Effectiveness of Education Policies in Latin America: A Survey of Expert Opinion

Schiefelbein, E., Wolff, L., & Schiefelbein, P. (1998). Inter-American Development Bank.

<http://www20.iadb.org/intal/catalogo/PE/2010/07125.pdf>

Costed outcome: education researchers estimate of standardised test score

Use of the unit cost: to provide recommendations for decisions made on education interventions

Sector: Education

Context: IADB research in Latin America

Tools/data sets: the opinion of ten international experts, mainly located in universities and international agencies, all of whom were well acquainted with educational research and with practical attempts at educational reform in the region

A Short-Term Cost-Effectiveness Evaluation of Better-Quality Daycare Centers

Barros, R., Carvalho, M., Franco, S., Mendonça, R., & Rosalém, A. (2011). *A Short-Term Cost-Effectiveness Evaluation of Better-Quality Daycare Centers*.

<https://publications.iadb.org/handle/11319/3961>

Costed outcome: Daycare Center quality

Use of the unit cost: to demonstrate the importance of daycare quality for child development

Sector: Education

Context: IADB research in Brazil

Tools/data sets: data set covering a sample of 100 publicly funded daycare centers in the city of Rio de Janeiro containing information on quality and cost of daycare centers as well as measures of child development and family background.

Health

Value for Money in Ukraine's HIV Response: Strategic Investment and Improved Efficiency

World Bank (2018). IBRD/World Bank

<https://openknowledge.worldbank.org/bitstream/handle/10986/24769/Value0for0mone00improved0efficiency.pdf?sequence=1&isAllowed=y>

Costed outcome: cost per additional year of life-expectancy

Use of the unit cost: informing allocation decisions

Sector: Health

Context: UNAIDS in the Ukraine

Taking the health aid debate to the subnational level: the impact and allocation of foreign health aid in Malawi

Marty, R., Dolan, C. B., Leu, M., & Runfola, D. (2017). *BMJ global health*, 2(1), e000129.

<http://gh.bmj.com/content/2/1/e000129>

Costed outcome: cost per malaria case averted

Use of the unit cost: investigating aid effectiveness

Sector: Health

Context: Academic article looking at aid effectiveness in Malawi.

Tools/data sets: (1) AidData's Malawi Aid Management Platform (AMP) data set, which includes data on the locations of aid projects recorded by the Government of Malawi's AMP and includes roughly 80% of all aid reported to the Ministry of Finance since 2000;²⁴ (2) Malawi's 2010/2011 Integrated Household Survey (IHS), which surveyed 12 271 households representing 56 218 individuals;²⁵ (3) Malawi's 2004/05 IHS, which surveyed 11 280 households representing 51 292 individuals;²⁵ (4) the locations of health facilities acquired from the Malawi Ministry of Health, which specified 783 health facilities constructed up to 1998²⁶ and (5) Malawi's 2008 census data.

Infrastructure

The cost of road infrastructure in low-and middle-income countries

Collier, P., Kirchberger, M., & Söderbom, M. (2015). *The World Bank Economic Review*, 30(3), 522-548.

<https://openknowledge.worldbank.org/bitstream/handle/10986/22664/The0cost0of0ro0dle0income0countries.pdf?sequence=1&isAllowed=y>

Costed outcome: Cost of 40 to 59 mm of asphalt overlay

Use of the unit cost: Description/investigation

Sector: infrastructure

Context: World Bank Policy research across countries

Tools/data sets: ROCKS data¹ (Roads Cost Knowledge System)

Regional evaluation on urban solid waste management in Latin America and the Caribbean – 2010 Report

¹ http://siteresources.worldbank.org/INTROADSHIGHWAYS/Resources/rocks_2-3_statistics3.xls

Espinoza, P.T. Arce, E.M., Daza, D., Faure, M.S. & Terraza, H. (2010). IADB.
<https://publications.iadb.org/handle/11319/3286>

Costed outcome: Cost per kilometre of road swept, cost per ton of trash collected (US\$25/ ton in 2002), cost per ton transferred (US\$13/ ton in 2002), and cost per ton disposed

Use of the unit costs: for determining budgets that ensure the financial, environmental, and social sustainability of solid waste services in a regulatory structure with both fees and subsidies

Sector: WASH

Context: Pan American Health Organization (PAHO), Inter-American Association of Sanitary and Environmental Engineering (AIDIS), and IDB evaluation

Tools/data sets: Regional Evaluation of Municipal Solid Waste Management in LAC 2010

Cost-Benefit Analysis of Off-Grid Solar Investments in East Africa

USAID (2017)

<https://www.usaid.gov/sites/default/files/documents/1865/Cost-Benefit-Analysis-Off-Grid-Solar-Investments-East-Africa.pdf>

Costed outcome: Net Present Value energy

Use of unit cost: to demonstrate how Development Innovation Ventures' investments into the East African solar market have created value for money

Sector: Energy

Context: USAID project Rwanda, Tanzania, and Uganda

Tools/data sets: Firm surveys and household surveys

Agriculture

Economic analysis of feed the future investments rural value chains project – AGEXPORT

USAID (2013)

<https://www.usaid.gov/sites/default/files/documents/1865/Guatemala%20Agexport%20CBA%20-%20Economic%20Analysis.pdf>

Costed outcome: Net Present Value² of farm

Use of the unit cost: Cost benefit analysis to inform decisions regarding project direction and resources

Sector: Agriculture

Context: USAID project with the local group Asociación Guatemalteca de Exportadores (AGEXPORT)

Tools/data sets: National Institute of Statistics' (INE) National Survey of Livelihood, AGEXPORT reports, and Ministry of Agriculture data

Economic Analysis of Feed the Future Investments in Guatemala: Rural Value Chains Project — Anacafe

USAID (2015)

² USAID definition of NPV: Net Present Value (NPV): The primary measure of a project's financial and economic impact, after accounting for all costs and benefits. The NPV is the increased benefits generated by the project in present value terms.

<https://www.usaid.gov/sites/default/files/documents/1865/Anacafe%20CBA%20Economic%20Analysis%20PUBLIC.pdf>

Costed outcome: Net Present Value of farm

Use of the unit cost: to inform decisions regarding project direction and resources

Sector: Agriculture

Context: USAID project with Anacafe Guatemala

Tools/data sets: Project data alongside data from AGEXPORT and the Ministry of Agriculture

3. Useful resources

This section notes documents and resources recommended by experts or found through searching for evidence that may help to inform debates in the area of unit costing results for development projects.

iDSI reference case for economic evaluations

International Decision Support Initiative (iDSI). Webpage accessed 2/4/18

<http://www.idsihealth.org/resource-items/idsi-reference-case-for-economic-evaluation/>

The iDSI reference case is a principle-based approach to guide the planning, conduct and reporting of economic evaluations. It provides decision makers with relevant and reliable ways to determine the likely implications of implementing a treatment or health service in specific contexts. Its primary focus is on meeting the informational needs of decision makers in low- and middle-income countries (LMICs). It builds on the methods and approaches of the National Institute for Health and Care Excellence (NICE) in the UK, the Health Intervention and Technology Assessment Program (HITAP) in Thailand and the World Health Organization, the iDSI Reference Case helps countries to calculate value for money and to consistently spend their health budgets effectively.

Some of the biggest decisions that must be made within health systems are on how to spend the health budget. These unavoidable decisions will have large consequences. Understanding the expected clinical effect of differing health treatments and services, and how much it will cost to achieve that clinical effect, is called determining the value. When people know the value of the different options, decision making becomes easier and money can be spent more effectively on health.

This research provides evidence that foreign health aid effectively reduced malaria and enhanced perceptions of healthcare quality in Malawi. Aid effectiveness results vary according to the specific sector of health aid examined; the most robust results point to the effectiveness of parasitic control and basic infrastructure aid. Aid effectiveness results are economically substantial, with aid preventing a conservatively estimated 85 000 cases of malaria in 2010 alone, enabling people able to engage in up to a collective 535 000 additional days of productive activities due to not being sick

In total, US\$113.8 million was allocated in aid for projects used in aid impact analyses. Directly comparing aid flows to cases of malaria averted yields US\$1300 per case averted; however, true costs per case averted will be lower as not all aid dollars were directly targeted towards malaria projects. For example, a number of projects were not exclusively focused on reducing malaria

(eg, projects directed towards strengthening local health systems or clinics) and health initiatives were sometimes secondary efforts in aid projects; of the World Bank's US\$33.8 million Education Sector Support project, US\$3 million was directly targeted towards health efforts. Owing to difficulties in ascribing costs specifically targeted for combatting malaria, caution should be taken in making judgements about cost-effectiveness of aid based solely on these results.

Cost-Benefit Analysis in World Bank Projects

Warner, A.M. (2010) IBRD/World Bank

<https://openknowledge.worldbank.org/bitstream/handle/10986/2561/624700PUB0Cost00Box0361484B0PUBLIC0.pdf?sequence=1.pdf>

Cost-benefit analysis used to be one of the World Bank's signature issues. It helped establish the World Bank's reputation as a knowledge bank and served to demonstrate its commitment to measuring results and ensuring accountability to taxpayers. Cost-benefit analysis was the Bank's answer to the results agenda long before that term became popular. This report takes stock of what has happened to cost-benefit analysis at the Bank, based on analysis of four decades of project data, project appraisal documents and implementation, completion and results reports from recent fiscal years, and interviews with current staff at the Bank.

The percentage of Bank projects that are justified by cost-benefit analysis has been declining for several decades, owing to a decline in adherence to standards and to difficulty in applying cost-benefit analysis. Where cost-benefit analysis is applied to justify projects, the analysis is excellent in some cases, but in many cases there is a lack of attention to fundamental analytical issues such as the public sector rationale and comparison of the chosen project against alternatives. Cost-benefit analysis of completed projects is hampered by the failure to collect relevant data, particularly for low-performing projects. The Bank's use of cost benefit analysis for decisions is limited because the analysis is usually prepared after the decision to proceed with the project has been made.

Unit Costs and Performance Budgeting

Robinson, M. (2010) IMF Public Financial Management Blog

<http://blog-pfm.imf.org/pfmblog/2010/04/unit-costs-and-performance-budgeting.html>

An opinion piece. The author notes that unit costs can be particularly useful when applied to the right service such as hospitals and schools. The author cautions against attempting to unit cost public services across the board which do not have stable cost functions. They note the difficulty in unit costing preventative services such as the army and fire service.

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<https://www.usaid.gov/sites/default/files/documents/1865/Guatemala%20Agexport%20CBA%20- %20Economic%20Analysis.pdf>

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