

Water resource development

An updated manual for cost benefit analysis for water resource development

The widely used Water Research Commission (WRC) cost-benefit analysis manual has been updated and revised to reflect more recent prices.

Background

The evaluation of water resource projects is often a difficult task since costs and benefits do not occur only once, but appear over time. Furthermore, costs and benefits are often hidden, making them hard to identify, and also frequently difficult to measure.

The same problems occur when the decision-maker has to make a choice between a number of mutually exclusive projects intended to achieve the same goal via a number of different routes. These problems are not limited to capital projects; they also occur when decisions have to be made regarding the merits of current expenditure programmes.

The cost-benefit analysis (CBA) method provides a logical framework by means of which projects can be evaluated, serving as an aid in the decision-making process.



In 1989, the then Central Economic Advisory Services produced the original Manual for Cost-Benefit Analysis in South Africa. The WRC then revised the manual in 2001 and again in 2007 with specific reference to evaluating the development and management of water resources.

This manual is widely used by the public sector, especially by those departments involved in infrastructure investments. It is also used by other development finance organisations, such as the Development Bank of Southern Africa (DBSA).

In addition, this manual is very popular in both South Africa and neighbouring countries as a basis for training courses. It is estimated that around 400 copies of this manual have been distributed to various CMA practitioners across a wide spectrum of organisations (in addition to various downloads of the electronic version).

Third edition

The latest manual (the third edition) presents an update of the 2007 manual to reflect 2012 prices. This manual is specifically aimed at the decision-maker in the public sector, but can also be used outside the public sector.

To ensure that this manual provides practical guidelines for the CBA practitioners the research was conducted in close cooperation with the research manager at the WRC, members of the reference group and steering committee of the project, the DBSA, the Department of Water and Sanitation and leading CBA practitioners. As part of the process, four major workshops were held during the course of the project.

Highlights of the CMA manual

Main subjects discussed in the 2014 manual:

- Applications and limitations of CBA
- Methodology
- Criteria for project assessment
- Shadow and surrogate prices for South Africa
- Issues relating to water development
- Practical examples

The manual follows a broader approach to incorporate the relationships between CBA and other aspects of the economy. In this regard the following aspects have been included:

- The relationship between the principles of CBA and welfare economies;
- CBA as one component of the range of decision-making support instruments;
- The equity and efficiency principles.

Thus, it deals specifically with the uses, limitations and basic principles of CBA in order to explain the underlying conceptual framework to the reader.

The manual provides information for not only the analyst, but also contains insight into the CMA application possibilities for the decision-maker. This information is contained in the introduction and background, which form a separate section in the document.

Social costs and benefits

This manual advocates that the CBA concept needs to be widened to include the broader social costs and benefits derived from a project. Furthermore, it is also accepted that CBA is only one of several instruments for evaluating proposed projects.

One of the main objectives therefore was to incorporate an income weighing system. This system provides for the recognition of some of the macro-economic policies of the government, e.g. combating poverty and promoting regional development.

The impact of income distribution on CBA is specifically addressed in this manual. The fundamental point

of departure is that additional incomes for lower income groups be relatively more important than additional incomes for higher income groups.

Based on historical per capita income and expenditure data for South Africa and global empirical research on pure discount rates, a Social Time Preference Rate method of 8.35% was arrived at.

Sensitivity analysis

The manual also propagates the need for sensitivity analysis. In most cases, a CBA is performed for future projects and thus entails the estimation of certain key variables, such as expected prices and quantities. Although it could be accepted that the decision-maker is fully aware of the fact that the projected outcome of a project cannot be interpreted in absolute certain terms, it is important that the analyst provides the decision-maker with some idea of the degree of certainty/uncertainty to which the project outcome would be subjected to.

In this regard, both selective as well as general sensitivity analysis are discussed. A general sensitivity analysis hinges on the derivation of a probability distribution of possible outcomes.

As far as possible, a practical approach is followed in this manual. This applies specifically to the guidelines for shadow and surrogate prices.

Evaluating all the costs

Finally, the manual discusses various issues relating to evaluating development and management of water resources. For example, attention is given to water development and river basin management cost.

The subject of the opportunity cost of water is also addressed. The user of the manual is further provided with a list of environmental aspects related to water development. Methodologies to calculate the economic value of water for various water usages are discussed in detail.

Further reading:

To order the report, *A manual for cost benefit analysis in South Africa with specific reference to water resource development (Third Edition – Updated and Revised)* (Report No. TT 598/14) contact Publications at Tel: (012) 330-0340, Email: orders@wrc.org.za or Visit: www.wrc.org.za to download a free copy.