

WATER RESOURCES DEVELOPMENT

The original *Manual for Cost-Benefit Analysis in South Africa* published in 2002 has been updated to reflect 2006 prices.

A Cost-Benefit Analysis Manual

The CBA manual – historical context

In 1989, the then Central Economic Advisory Services produced the original *Manual for Cost-Benefit Analysis in South Africa*. This original manual was updated to reflect 2000 prices and extended to include additional concepts and explanations in October 2002 with the publication of *A Manual for Cost-Benefit Analysis in South Africa with Special Reference to Water Resource Development* (WRC Report No: TT 177/02).

A more recent update has now been produced that reflects 2006 prices. It is vitally important that, from time to time, such updates are made in order to provide users of this Cost-Benefit Analysis (CBA) manual with a current set of standardised, uniform parameters that will enable decision makers to arrive at sound conclusions and decisions.

Focus of the CBA manual update

This most recent updating exercise focused on the following aspects of the CBA manual:

The updating and expansion of shadow and surrogate prices: It is important to provide users with a set of standardised, uniform parameters so as to ensure that undertaking a CBA produces scientifically valid results that enable reliable interpretations and comparisons to be made.

The updating of the social discount rate: This current update has provided the platform for revising the social discount rate used in cost benefit analyses.

The updating of the computerised model for the determination of a weighted average shadow prices for the inputs of capital projects.

To ensure that this manual continues to provide practical and applicable guidelines for the CBA practitioners, the updating was done in close collaboration with a wide

spectrum of stakeholders. Four major workshops formed an integral part of the updating process.

With the exception of the above-mentioned aspects, all other facets of the CBA manual remain unchanged. In particular, all underlying theory contained in the previous manual is still valid for CBA and, as such, has been retained.

Content of the CBA manual

The main subjects discussed in the CBA manual are the following:

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

Throughout, applications are illustrated by way of practical examples.

Using the manual

Economic evaluation of the development and management of water resources 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 are 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 CBA method provides a logical framework by means of which projects can be evaluated, serving as an aid in the decision-making process.

As far as possible, a practical approach is followed in the manual. This applies specifically to the guidelines for shadow and surrogate prices. In this regard the following shadow/surrogate prices are provided:

- Shadow wages for unskilled labourers per province;
- Estimated annual remuneration for occupational categories in South Africa per province;
- Index of projected real effective exchange rate of the Rand;
- Index of projected prices for petrol and diesel;
- Index of estimated relative changes in electricity prices;
- Estimated time cost according to income groups; and
- Economic value of productive life.

As previously mentioned, the focus in this manual is on evaluating the development and management of water resources. In this regard various issues relating to such evaluation are discussed. 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. The user is assisted in the application of the guidelines by the provision of practical examples which include electricity, potable water, roads and municipal versus irrigation water schemes.

Special features

Certain special features of the CBA Manual deserve to be highlighted. For example, a broader-than-usual approach is followed by incorporating 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 economics;
- The concept of CBA being one of a range of decision-making support instruments; and
- Equity and efficiency principles.

The manual thus 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, which may also

include economic impact analyses, general equilibrium approaches and multi-criteria decision analysis, for evaluating proposed projects.

One of the main objectives, therefore, was to incorporate an income weighting system. This system provides for the recognition of some of the macroeconomic 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 should be relatively more important than additional incomes for higher income groups.

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.

Conclusion

In dealing specifically with the uses, limitations and basic principles of CBA the manual succeeds in also providing the reader with a comprehensive understanding of the conceptual framework underlying CBA.

Further reading:

A Manual for Cost Benefit Analysis in South Africa with Specific Reference to Water Resource Development (Report No: TT 305/07).

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