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Cost Benefit Analysis: Methods and Metrics for Curbing Illegal Wildlife Trade in Southern Africa

Namibia Nature Foundation
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The few wild places left on Earth attract an increasing number of tourists. Measured by employment, tourism is the world's largest industry.

> "... investments must be done responsibly, with information about the returns generated, and the distribution of costs and benefits across actors."

The economic impacts of illegal wildlife trade (IWT)

A cost benefit analysis (CBA) is an economic tool used to evaluate the impact of policies or initiatives. It consists of the monetization of costs and benefits borne by different economic actors, which are used to understand its economic viability, justify investment decisions, and provide a better understanding of potential trade-offs. Often, CBAs are used in combination with other impact assessment tools, as they emphasize monetary impacts but may leave out outcomes that are not monetary.

The CBA provides insights into the economic justification of investing in the fight against illegal wildlife trade (IWT). As poaching threats increase, the need for investments in curbing IWT also increases, but these investments must be done responsibly and with information about the returns generated and the distribution of costs and benefits across actors.

Questions the CBA can answer:

- Is the project worthwhile?
- What is the optimal scale for a project?
- What are its main constraints?
- Is it feasible to the private entrepreneur?
- Is it beneficial to society at large?
- How is the distribution of cost and benefits among different stakeholders?

Steps for conducting a CBA

1. Determine a framework, scope & units
2. Identify and quantify costs and benefits
3. Build scenarios and forecasts
4. Evaluate and compare results

Iconic species such as rhino have seen a catastrophic decline in numbers since the 1970s.

Step 1: Determine a framework

Key considerations for determining a CBA framework

- Functional units
- Scenario design
- Comparability
- Data availability
- Target audience and actors

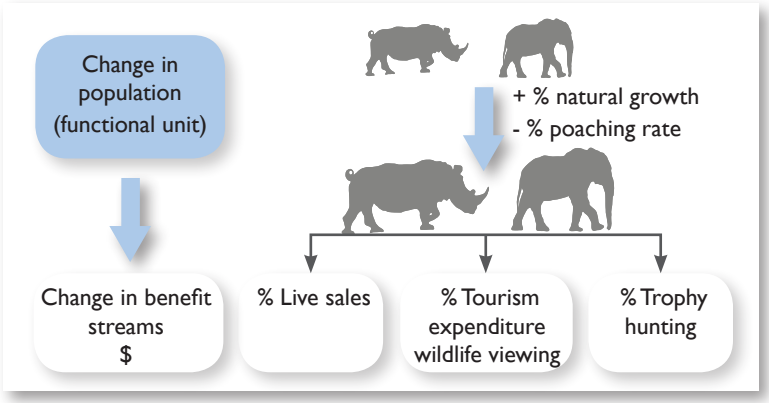
Functional units

When modelling the consequences of an investment decision, the size, direction and influence of certain variables will be key to the calculation of results. These are the functional units. In the case of IWT, the key relationships to model are:

- How curbing actions affect wildlife and,
- How wildlife generates benefits.

Therefore, often, the main functional unit of analysis is the population size of the target species. We can think of this as a key dependent variable of the model, where in turn costs and benefits change in relation to a change in population size for each species.

> "... costs and benefits change in relation to a change in population size for each species."



Lindsey et al. (2015) modeled the relationship between wildlife population size and tourism revenue as proportional and linear, where a 1% change in population translates into a 1% change in tourism revenue. Trophy hunting and live sales can be modeled directly based on population size, using existing quotas and expected changes pegged to population size.

Mana Pools National Park — one of Zimbabwe's premier wildlife destinations.

"The selection of costs and benefits is crucial to ensure key impacts are included."

Step 2: Costs and benefits

The selection of costs and benefits is crucial to set a study boundary and ensure that key impacts and actors are included. The most salient categories of costs and benefits associated with curbing IWT should be included.

In southern Africa, benefits from wildlife include wildlife watching tourism revenue, live sales, hunting revenue, and meat production, among others.

COSTS	BENEFITS
Crime, violence, and corruption	Non-market benefits
Opportunity costs for economic development	Live sales
Cost of human-wildlife conflict	Hunting revenue
Direct expenditures on curbing programs	Tourism revenue

Some studies suggest that as much as 80% of international tourism to Africa is lured by the opportunity to see rare species native to the continent (Porsch et al., 2015).

Challenges when identifying and quantifying costs and benefits

Scope and attribution

Although IWT impacts a wide array of fauna and flora, the CBA may choose to focus on certain key species, to keep the analysis manageable and in line with data availability and existing evidence. For example, populations of rhinos and elephants have been used as proxies to estimate the costs and benefits related to curbing IWT. Although this constrains the scope of the study, these two species represent a large portion of IWT in southern Africa and are also a big draw for tourism.

Distribution and boundaries

Revenue from poaching is unevenly distributed along the value chain, which is also transnational. Foot soldiers make only a fraction of the consumer price

To most tourists, landscapes, ambience and cultural experiences are almost as important as the wildlife thus highlighting the importance of broad environmental conservation.

obtained at the final sale, which tends to happen outside of the country. Therefore, when conducting a country-specific CBA, it is important to understand the places where actors operate, their revenue and leakages out of the country.

Non-market costs and benefits and data availability

Some impacts may not have a dollar value, in which case an attempt to assign a dollar value can be made using non-market valuation methods. When data are not available, or costs and benefits cannot be translated realistically into dollar values, their impacts will be omitted from the CBA and thus the decision-making process. These impacts can include the loss of biodiversity, cultural impacts, the costs of crime and corruption, the costs of human fatalities, and reputational risks.

> "A CBA must account for the expected change in the value of benefits and costs over the foreseeable future."

Step 3: Scenarios and forecasts

A CBA must account for the expected change in the value of benefits and costs over the foreseeable future. One of the most common sources of error and uncertainty in CBAs is related to the forecasting of trends for key variables. Forecasting future conditions, including revenues and costs can be very difficult and can also involve critical assumptions that determine the results of the CBA.

Time horizon
Dependent on the decision being made, the project lifetime, and levels of uncertainty about future costs and benefits.

Discount rate
Accounts for the potential cost of capital (opportunity cost from not investing in other profitable activities) and an assumed time preference for benefits now rather than in the future. The higher the discount rate, the less important future value is.

Uncertainty
Assumptions under uncertainty threaten the validity of results. To mitigate uncertainty, the use of scenario analysis can integrate a trajectory of potential paths to predict a range of possibilities. Different scenarios based on different suites of assumptions, open a path towards expanded decision criteria.

→ Robust forecast

Tourism is increasingly moving from 'sun-and-surf' destinations to more adventurous and experiential holidays. Southern Africa provides diverse and superlative alternatives.

"The Net Present Value is the best criterion for the evaluation of a public investment."

In order to interpret and compare results across scenarios, there are several indicators that can be derived from a CBA.

INDICATORS THAT CAN BE DERIVED FROM A CBA	
Net present value	Sum of net benefits generated indicating how much value is generated by the project over its lifetime.
Benefit cost ratio	The ratio of benefits to costs, meaning that for every dollar invested how much is return on investment.
Internal rate of return	Shows how long it will take to recover an initial investment.
Additional criteria	Upfront investment requirements, or distribution of net benefits across actors can also contribute to decision-making depending on priorities.

The Net Present Value is the best criteria for the evaluation of a public investment.

A sensitivity analysis should be carried out with those variables that have most uncertainty and significant influence on the results to evaluate the robustness of the model. This means that the results are recalculated with different assumptions.

A post evaluation with key stakeholders is often recommended to monitor results, calibrate forecasts, and adopt adaptive management practices.

A CBA is one of many decision-making aid tools but does not necessarily account for all important factors and impacts. Other tools can be used in conjunction with the CBA.

This policy brief was prepared by Tania Briceno (Conservation Strategy Fund) and Juliette Perche (Namibia Nature Foundation), authors of the corresponding report "Namibia Case Study: Cost-Benefit Analysis of Curbing Illegal Wildlife Trade" published in May 2021 for the USAID VukaNow Activity project "Assessing the economic impact of Illegal Wildlife Trade in the SADC region". The views represented in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States government.

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