

Method Brief

Tunisia: Environmental Cost-Benefit Analysis

Tool

An environmental Cost-Benefit Analysis (CBA) was conducted within the context of a vulnerability assessment on ecosystems of cork forest and alfa fields, carried out in 2010/2011 in Tunisia. The environmental CBA assessed the economic value of the various goods and services (G&S) provided by these ecosystems, and estimated the potential loss of the economic value through the impact of climate change (CC).

Scope and entry points

The approach was designed to meet the immediate need for improving information on CC impacts from an economic risk perspective and to promote the best adaptation measures at the decision-making level within the Forestry Directorate General. The new national strategy for forest development, due to be drafted in 2013, will include CC adaptation and economic assessments of forest ecosystem G&S aiming at optimizing the ecosystems sustainably. The results of this 'pilot' application of an environmental CBA will be taken into account when revising the alfa field development plans and when identifying optimisation measures for the G&S of the cork forest (FFEM-DGF project: 'Optimising the Production of Goods and Services by the Mediterranean Forest Ecosystems in the Context of Global changes').

How it works

The 'pilot' implementation of this tool consisted of three steps. A fourth step should be devoted to assessing adaptation options, but was not executed within the context of the pilot.

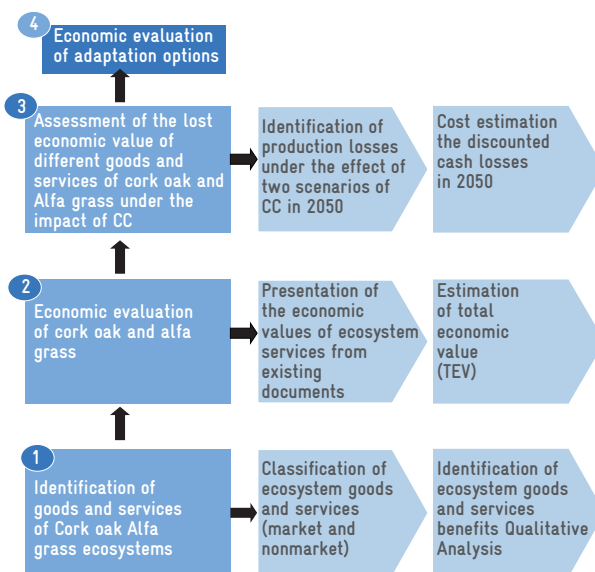


Figure: Steps and main sub-steps of implementation of the method

Step 1: Identification of goods & services

Part of the identification of the G&S is a classification of the identified ecosystem G&S that is based on the concept of total economic value (TEV, *Merlo and Coitoru, 2005*). The G&E were classified by type of service (production, ecological, social, i.e. supply/levy services, regulative services, cultural services, self-sustaining services), and the recipient, e.g. Tunisian state, user community, Tunisian society and international community (see table).

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Table: G&S of cork forest	G&S	Recipients
Supply services	Cork, mushrooms, myrtle, fuel wood, hunting	Government
	Fodder, acorn, fuel wood, snails, honey, PAM, hunting	Stock farmers Hunters
Regulative services	Protection against water erosion (silting) carbon catchment	Tunisian Society Global Community
Cultural services	Leisure, landscape, cultures and traditions	Tunisian Society
Support services	Biodiversity Conservation	Society and Global Community

Step 2: Economic evaluation

For the cork oak ecosystem, the main methods used were based on market prices, production function method, travel cost and protection cost method.

For alfa fields, evaluation techniques refer to the market price for alfa leaves, the international price for the quantity of fixed carbon, the substitution costs for fodder production, the changes in production of services linked to the erosion control, and the cost of protection measures for biodiversity conservation.

The TEV was estimated by aggregating the values of all goods and services.

Step 3: Assessment of the lost economic value

The economic values of the changes in G&S flows induced by CC were assessed in two steps:

- Identification of physical impacts (negative and positive) of environmental changes on economic activities.
- Economic evaluation of changes in production or consumption induced by CC, using the same methods as for step 2. Avoided damage and replacement cost methods were used for assessing the costs related to degradation.

Moreover, discounting helped to translate the values of year n (2050 in future) into their present value. The choice of the discount rate (2 %) was based mainly on the long analysis period, the inflation of prices for G&E, depending on supply and demand and on the availability of competing services.

Specifics of application

Stakeholders and institutional set-up

The leading institution for the pilot was the Forestry Directorate General (DGF). The forest districts provided information and were involved in the field work. The CCC/GIZ project played a facilitating role in addition to financing the activity (developing the terms of reference, coaching the team of experts, periodic updates, and exchange workshops).

Input

Upstream, data input is necessary (provided by the DGF, forest districts, l'Institut National de Recherche en Génie Rural, Eaux et Forêts (INRGREF), and by other research institutes). Their availability and if possible their reliability should be checked. An interdisciplinary team of specialists was set up. An expert in forest economics was assigned the specific task of applying this method, in close coordination with the other members of the group who carried out the vulnerability biophysical analyses. The assessment of goods and services requires approximately 2 months but within the larger framework of vulnerability analysis (VA) would require 18 months.

Output

- Data compilation in form of tables and diagrams on the nature, value of benefits and their distribution in terms of the G&S of both ecosystems.
- Visualisation of actual value of G&S losses due to CC based on scenarios, compared to those of goods and services with no CC impact in 2020 and in 2050.

Capacity required and ease of use

In Tunisia, the required expert profiles (environmental economist and technical specialists in erosion, water resources etc.) do exist, but must mainly be mobilised through consultancy and external technical assistance projects. The assessment of ecosystem G&S can ideally be carried out within the context of a VA, considering the diversity of the required data. The main constraint is the need for upstream data, which can only be produced within the framework of coherent and long-term research programmes. However, research work suffers from a chronic lack of budget and from deficits in terms of identifying and integrating research themes. This is compounded by inter-sectoral coordination difficulties.

Conclusions for future application

Outcome and added value

The new forest development strategy for 2013–2022 will integrate the consolidation of adaptation and mitigation measures and consider the economic value for ecosystem G&S with a view to leveraging and sustainably optimize these resources. In the short-run, the terms of reference for updating the land-use plans will be revised in order to take into consideration the production of market and non-market services (note: timber production is ranked in fourth position among forest goods in Tunisia), will be launched with GIZ support.

Cost-benefit ratio

The outcomes of these evaluations provide very strong arguments to help decision-makers commit themselves to supporting adaptation actions. However, in view of the extent of resources to be mobilised, the method can only be relevant to priority application cases.

Potential for replication

The choice of evaluation methods for G&S costs was made by prioritising the availability of information and the ease of applying this information in a timely fashion, also considering the replicability of the method. More complex evaluation methods, such as contingent valuation, were thus discarded.

The new forest development strategy for 2013–2022 will integrate the consolidation of adaptation and mitigation measures for CC and the consideration of the economic value for ecosystem G&S with a view to the leveraging and sustainable optimisation of these resources. This provides a favourable replication framework.

However, as such application is only possible within a larger and more complex vulnerability analysis context, its utilisation is limited by significant funds required for its implementation.

Account also needs to be taken of:

- Difficulties in obtaining the required data, which are sometimes available only within the framework of medium term and long-term research programmes.
- The necessity of developing the evaluation stage of adaptation alternatives; indeed, a cost-benefit analysis would enable the selection of the best (most efficient) alternative and the appropriate intervention period (immediate or delayed).
- The need for harmonising G&S evaluation methods, while prioritising methods that could be controlled in terms of time and in costs.

References

Documents

- 1 Study on the vulnerability of the cork forest to climate change. Ministry of Environment, GIZ, 2011, Tunis.
- 2 Study on the vulnerability of the alfa ecosystem to climate change in the Governorate of Kasserine, Ministry of Environment, GIZ, 2011, Tunis.

- 3 Economy of ecosystems and of cork forest biodiversity as well as of alfa fields (within the context of studies on cork forest vulnerability (ecosystem limits in Jendouba and Béja) and of alfa fields (Kasserine), Hamed Daly, Ministry of Environment, GIZ, 2011.
- 4 Methodological guide for the approach to assessing ecosystem goods and services, Ministry of Environment, GIZ, 2012.
- 5 Millennium Ecosystem Assessment
Source: Millennium Ecosystem Assessment, 2005.
- 6 Optimisation project for the production of goods and services by the Mediterranean forest ecosystems in the context of the global change (www.ffem.fr).
- 7 Economic assessment of Tunisian forest goods and services, summary note, Ministry of Agriculture, Direction Générale des Forêts, National forest programme facility, FAO July 2012.
- 8 The economics of ecosystems and biodiversity for local and regional policy makers. TEEB, 2010. Earthscan, London.

Websites

- www.teebweb.org
- <http://teeb-tunis.yolasite.com>

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