TECHNICAL PAPER

Ecosystems Based Adaptation: Knowledge Gaps in Making an Economic Case for Investing in Nature Based Solutions for Climate Change

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Introduction

Changes in global climate are increasingly having adverse impacts on human populations and natural systems. This has resulted in increased efforts to come up with options that can mitigate the impacts, as well as help communities to adapt to already occurring changes.

Ecosystem based Adaptation (EbA) is increasingly being considered as a strong and cost-effective means of dealing with the impacts of a changing climate. It is used by a number of organisations and in many developed and developing countries as a means for climate adaptation, especially at the community level. It is also applied for disaster risk reduction. Still, there is a propensity of policy makers to implement traditional engineering solutions for adaptation rather than investing in EbA. There is, therefore, a need to raise further awareness on the cost-effectiveness of nature based solutions to deal with a changing climate.

An important approach to promote investment in EbA is to identify its economic costs and benefits. This is because policy makers need information to compare EbA projects with engineered solutions on equal terms. This study[1] therefore reviewed a number of projects in Costa Rica, India, Mexico, Peru, Philippines and Tanzania, to assess existing data and knowledge gaps regarding the economic costs and benefits of EbA projects. The projects reviewed for each country are not specific to EbA; some of them are general ecosystem conservation projects due to lack of economic information regarding EbA options. However, the reason for their inclusion was that they tend to increase the resilience of people and biodiversity.

The reviewed countries are dependent on natural systems for their economic growth. All of them rely on agriculture, fisheries or forestry as main economic sectors, which contribute extensively, not only at the local levels but also to the national exchequer. The literature review showed that climate change is likely to change the productivity of and benefits from the agriculture, fisheries and forestry sectors. Already, impacts are being observed in terms of lower yields and productivity as well as loss of livelihoods and security.

For more information, please contact :

Ali Raza Rizvi
Progarmme Manager,
Ecosystem based Adaptation
Global Ecosystem Management Programme,
IUCN
aliraza.rizvi@iucn.org

This paper is based on a study carried out to assess existing data and knowledge gaps regarding the economic costs and benefits of EbA projects in select countries.

IUCN World Headquarters
Rue Mauverney 28
1196 Gland
Switzerland
Tel: +41 22 999 0000
Fax: +41 22 999 0002
mail@iucn.org
www.iucn.org

[1] Detailed study is available at http://iucn.org/about/work/programmes/ecosystem_management/climate_change/eba/

While EbA projects as well as sustainable development and conservation projects are being implemented in the six countries, there is a lack of a conclusive evidence base to highlight the cost-effectiveness of ecosystems based approaches to deal with climate change. Furthermore, inadequate technical knowledge regarding the designing and implementation of projects, as well as issues related to capacity, also serve as obstacles to effective implementation (Naumann *et al*, 2010). An important challenge is regarding the distribution of institutional, financial and technical resources.

In terms of cost benefit analysis, while information on the costs invested was easily available, there was lack of quantitative data that would help to assess the economic benefits provided by EbA projects, especially because benefits were generally highlighted in qualitative terms. The available national data was insufficient to give a clear understanding of the contribution of ecosystems on which agriculture, fisheries and forestry rely, to the economy. The results were context specific and from different time periods, therefore difficult to apply to other scales and more importantly benefits accrued were not easy to quantify. A study undertaken by Naumann *et al* (2011) of EbA projects in Europe showed variations in the amount and quality of evidence across projects. There were also data gaps regarding opportunity costs borne by communities in most cases. The assessment in this study also conforms to this. This is because no clear cost benefit analyses were undertaken and most of the information is the result of anecdotes and estimations by project managers.

The case studies however do indicate that many of the projects that applied ecosystems based approaches resulted in benefits that could be translated into economic terms to some extent. It can also be presumed that the EbA projects are likely to be more cost effective than traditional engineering solutions, but in some cases the impacts of climate change may be so large that only engineered solutions will work. However, it is clear that further evidence is needed to make the case for EbA stronger and this requires analysis of the economic costs and benefits of EbA options. Such studies would make the economic case for investing in EbA and to mainstream the approach into planning. Detailed and robustly designed studies will further provide information to scale up EbA from local levels to more national and global arenas and also be an awareness raising tool to show damage avoided and benefits accrued.

The challenge is not only to value the benefits provided by EbA projects to show that they are not only more cost-effective in the long run, but to give optimal attention to natural systems, biodiversity and species; a rather more difficult undertaking. However, such evidence collected at the local level will inform strategic thinking nationally as well as globally. Non-market economic valuation methods can estimate values of EbA benefits that do not have market prices. Using non-market valuation helps to account for all of the benefits of EbA and allows it to be compared on a more level playing field with engineered adaptation.

Two approaches can be applied: undertaking cost benefit analysis before initiating the project to help stakeholders understand the costs and benefits of different EbA activities. More importantly however, there is a need to undertake detailed economic analyses of ongoing and completed projects in the six countries, to understand and gather the evidence that describes why EbA was more cost-effective than other solutions. This can then be extrapolated for national level EbA approaches, policies and strategies.

Extensive assessments will need methodologies that would differentiate between EbA and other development costs. This is important because it is difficult to differentiate between them and the two

approaches are often integrated. Defining one-time and recurrent costs is also a necessary component in addition to having a uniform costing methodology.

This study highlighted the importance of agriculture, fisheries and forestry to the national economy. Detailed studies must differentiate between these sectors, as well as the water sector. Reviews of ecosystems contribution to agriculture; fisheries (especially in terms of coral reefs and mangroves); contribution of forests (and forest biodiversity and species) will make a strong economic case for Ecosystem based Adaptation.

In terms of quantifying the benefits accrued, appropriate assessment criteria must be established. As such there is a need for uniform and shared guidelines and methodologies that would provide crucial results to make the economic case for Ecosystem based Adaptation. It is also important to include monetary values of co-benefits, especially with regard to increased mitigation potential, among others.

The bottom line is this: the understanding of economic costs and benefits of ecosystem based approaches will provide additional important information that would assist decision making at the local, national and global levels. While uncertainties and challenges may still remain, robust and appropriately designed valuation methodologies can help to decrease them. Detailed cost benefit studies, therefore, must be undertaken of ongoing and completed projects in these countries, to decrease the existing knowledge gaps and to show policy makers why they should invest in Ecosystem based Adaptation.